Enterasys Matrix™ X

Secure Core Router

X4-C Chassis Installation Guide

P/N 9034084-02

enterasys®

Electrical Hazard: Only qualified personnel should perform installation procedures.

Riesgo Electrico: Solamente personal calificado debe realizar procedimientos de instalacion.

Elektrischer Gefahrenhinweis: Installationen sollten nur durch ausgebildetes und qualifiziertes Personal vorgenommen werden.

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Part Number: 9034084-02 February 2007

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Regulatory Compliance Information

Federal Communications Commission (FCC) Notice

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: This equipment has been tested and found to comply with the limits for a class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment uses, generates, and can radiate radio frequency energy and if not installed in accordance with the operator's manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause interference in which case the user will be required to correct the interference at his own expense.

WARNING: Changes or modifications made to this device which are not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Industry Canada Notice

This digital apparatus does not exceed the class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la class A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

Class A ITE Notice

WARNING: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Clase A. Aviso de ITE

ADVERTENCIA: Este es un producto de Clase A. En un ambiente doméstico este producto puede causar interferencia de radio en cuyo caso puede ser requerido tomar medidas adecuadas.

Klasse A ITE Anmerkung

WARNHINWEIS: Dieses Produkt zählt zur Klasse A (Industriebereich). In Wohnbereichen kann es hierdurch zu Funkstörungen kommen, daher sollten angemessene Vorkehrungen zum Schutz getroffen werden.

Product Safety

This product complies with the following: UL 60950, CSA C22.2 No. 60950, 73/23/EEC, EN 60950, IEC 60950, EN 60825, 21 CFR 1040.10.

Seguridad del Producto

El producto de Enterasys cumple con lo siguiente: UL 60950, CSA C22.2 No. 60950, 73/23/EEC, EN 60950, IEC 60950, EN 60825, 21 CFR 1040.10.

Produktsicherheit

Dieses Produkt entspricht den folgenden Richtlinien: UL 60950, CSA C22.2 No. 60950, 73/23/EEC, EN 60950, IEC 60950, EN 60825, 21 CFR 1040.10.

Electromagnetic Compatibility (EMC)

This product complies with the following: 47 CFR Parts 2 and 15, CSA C108.8, 89/336/EEC, EN 60825, EN 55022, EN 61000-3-2, EN 61000-3-3, EN 55024, AS/NZS CISPR 22, CFR 1040.10, VCCI V-3.

Compatibilidad Electromágnetica (EMC)

Este producto de Enterasys cumple con lo siguiente: 47 CFR Partes 2 y 15, CSA C108.8, 89/336/EEC, EN 60825, EN 55022, EN 55024, EN 61000-3-2, EN 61000-3-3, AS/NZS CISPR 22, CFR 1040.10, VCCI V-3.

Elektro-magnetische Kompatibilität (EMC)

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Hazardous Substances

This product complies with the requirements of European Directive, 2002/95/EC, Restriction of Hazardous Substances (RoHS) in Electrical and Electronic Equipment.

European Waste Electrical and Electronic Equipment (WEEE) Notice

In accordance with Directive 2002/96/EC of the European Parliament on waste electrical and electronic equipment (WEEE):

1. The symbol above indicates that separate collection of electrical and electronic equipment is required and that this product was placed on the European market after August 13, 2005, the date of enforcement for Directive 2002/96/EC.
2. When this product has reached the end of its serviceable life, it cannot be disposed of as unsorted municipal waste. It must be collected and treated separately.
3. It has been determined by the European Parliament that there are potential negative effects on the environment and human health as a result of the presence of hazardous substances in electrical and electronic equipment.
4. It is the users' responsibility to utilize the available collection system to ensure WEEE is properly treated.

   For information about the available collection system, please go to http://www.enterasys.com/services/support/ or contact Enterasys Customer Support at 353 61 705586 (Ireland).

产品说明书附件
Supplement to Product Instructions

部件名称 (Parts)	有毒有害物质或元素 (Hazardous Substance)					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr^{6+})	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
金属部件 (Metal Parts)	×	○	○	×	○	○
电路模块 (Circuit Modules)	×	○	○	×	○	○
电缆及电缆组件 (Cables & Cable Assemblies)	×	○	○	×	○	○
塑料和聚合物部件 (Plastic and Polymeric parts)	○	○	○	○	○	×
电路开关 (Circuit Breakers)	○	○	×	×	○	○

○： 表示该有毒有害物质在该部件所有均质材料中的含量均在 SJ/T 11363-2006 标准规定的限量要求以下。
Indicates that the concentration of the hazardous substance in all homogeneous materials in the parts is below the relevant threshold of the SJ/T 11363-2006 standard.

×： 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出SJ/T 11363-2006 标准规定的限量要求。
Indicates that the concentration of the hazardous substance of at least one of all homogeneous materials in the parts is above the relevant threshold of the SJ/T 11363-2006 standard.

对销售之日的所售产品, 本表显示,
凯创供应链的电子信息产品可能包含这些物质。注意:在所售产品中可能会也可能不会含有所有所列的部件。
This table shows where these substances may be found in the supply chain of Enterasys' electronic information products, as of the date of sale of the enclosed product. Note that some of the component types listed above may or may not be a part of the enclosed product.

除非另外特别的标注, 此标志为针对所涉及产品的环保使用期标志. 某些零部件会有一个不同的环保使用期(例如, 电池单元模块)贴在其产品上.
此环保使用期限只适用于产品是在产品手册中所规定的条件下工作.
The Environmentally Friendly Use Period (EFUP) for all enclosed products and their parts are per the symbol shown here, unless otherwise marked. Certain parts may have a different EFUP (for example, battery modules) and so are marked to reflect such. The Environmentally Friendly Use Period is valid only when the product is operated under the conditions defined in the product manual.

VCCI Notice

This is a class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may arise. When such trouble occurs, the user may be required to take corrective actions.

この装置は，情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

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This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

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Safety Information
Class 1 Laser Transceivers

The single mode interface modules use Class 1 laser transceivers.
Read the following safety information before installing or operating these modules.

The Class 1 laser transceivers use an optical feedback loop to maintain Class 1 operation limits. This control loop eliminates the need for maintenance checks or adjustments. The output is factory set, and does not allow any user adjustment. Class 1 Laser transceivers comply with the following safety standards:

- 21 CFR 1040.10 and 1040.11 U.S. Department of Health and Human Services (FDA).
- IEC Publication 825 (International Electrotechnical Commission).
- CENELEC EN 60825 (European Committee for Electrotechnical Standardization).

When operating within their performance limitations, laser transceiver output meets the Class 1 accessible emission limit of all three standards. Class 1 levels of laser radiation are not considered hazardous.

When the connector is in place, all laser radiation remains within the fiber. The maximum amount of radiant power exiting the fiber (under normal conditions) is -12.6 dBm or 55 x 10^{-6} watts.

Removing the optical connector from the transceiver allows laser radiation to emit directly from the optical port. The maximum radiance from the optical port (under worst case conditions) is 0.8 W cm^{-2} or 8 x 10^{3} W m^{2} sr-1.

Do not use optical instruments to view the laser output. The use of optical instruments to view laser output increases eye hazard. When viewing the output optical port, power must be removed from the network adapter.

Declaration of Conformity

Application of Council Directive(s):	**89/336/EEC** **73/23/EEC**
Manufacturer's Name:	**Enterasys Networks, Inc.**
Manufacturer's Address:	**50 Minuteman Road** **Andover, MA USA 01810**
European Representative Address:	**Enterasys Networks, Ltd.** **Nexus House, Newbury Business Park** **London Road, Newbury** **Berkshire RG14 2PZ, England**
Conformance to Directive(s)/Product Standards:	**EC Directive 89/336/EEC** **EN 55022** **EN 61000-3-2** **EN 61000-3-3** **EN 55024** **EC Directive 73/23/EEC** **EN 60950** **EN 60825**
Equipment Type/Environment:	**Networking Equipment, for use in a Commercial or Light Industrial Environment.**

Enterasys Networks, Inc. declares that the equipment packaged with this notice conforms to the above directives.

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About This Guide

This guide describes the Enterasys Matrix™ X4-C chassis features, options, specifications, and provides information to install the chassis in a standard 19-inch (48.26-centimeter) equipment rack or cabinet. This guide also explains how to interpret the system status LEDs to facilitate troubleshooting when necessary, and provides information on how to contact Enterasys Networks if additional help is needed.

Who Should Use This Guide

This guide is intended for a network administrator who is responsible for installing and setting up the Matrix X Router system.

Electrical Hazard: Only qualified personnel should install or service this unit.

Riesgo Electrico: Nada mas personal capacitado debe de instalar o darle servicio a esta unida.

Elektrischer Gefahrenhinweis: Installationen oder Servicearbeiten sollten nur durch ausgebildetes und qualifiziertes Personal vorgenommen werden.

Using This Guide

Read through this guide completely to familiarize yourself with its contents and to gain an understanding of the features and capabilities of the Matrix X4-C chassis.

This chapter provides preliminary information to help you use this guide and a brief summary of each chapter. It also discusses the Matrix X4-C manual set and defines conventions used throughout this document.

For information about ...	Refer to ...
Features and capabilities of the Matrix X4-C, and how to get help	Chapter 1, **Overview**
Installation site requirements that must be met before installing the Matrix X4-C in a cabinet or rack, configuration guidelines, and operating specifications for the X4-C enclosure and power supply modules	Chapter 2, **Site and Configuration Guidelines**
Rack-mounting the Matrix X4-C; using the optional Cable Management Kit; installing the power supply modules, fan trays, and DIMM Upgrade Kit; powering up the chassis; and performing first-time configuration	Chapter 3, **Matrix X4-C Chassis Setup**
Environmental, operating, and power budgeting specifications for the Matrix X4-C; power supply modules; twist lock plugs; fan trays; 1- and 10-Gigabit Ethernet transceivers; COM port pin assignments; and regulatory compliances	Appendix A, **Specifications and Regulatory Compliance**

Using the Matrix X Router Manual Set

Additional documents are provided to explain installation of X Router Input/Output Modules (IOMs) in the Matrix X4-C, configuration of CLI commands on the Matrix X4-C and how to apply these commands with more in-depth instructions, how to respond to error messages that may appear on the command line, and advise you on the latest Release Notes.

Each document in this set assumes that the qualified personnel installing the module has a general working knowledge of data communications networks and their physical layer components.

The following related Matrix X Router documentation is available:

- *Matrix X Router Configuration Guide*
- *Matrix X Router Command Line Interface Reference Guide*
- *Matrix X Router Quick Reference* cards
- *Matrix X Router Release Notes*

Documentation can be accessed on the World Wide Web, at the following URL:

http://www.enterasys.com/support/manuals

Conventions Used in This Guide

The following conventions are used in this guide:

Note: Calls the reader's attention to any item of information that may be of special importance.

Caution: Contains information essential to avoid damage to the equipment.

Precaución: Contiene información esencial para prevenir dañar el equipo.

Achtung: Verweißt auf wichtige Informationen zum Schutz gegen Beschädigungen.

Electrical Hazard: Warns against an action that could result in personal injury or death due to an electrical hazard.

Riesgo Electrico: Advierte contra una acción que pudiera resultar en lesión corporal o la muerte debido a un riesgo eléctrico.

Elektrischer Gefahrenhinweis: Warnung vor sämtlichen Handlungen, die zu Verletzung von Personen oder Todesfällen – hervorgerufen durch elektrische Spannung – führen können!

Warning: Warns against an action that could result in personal injury or death.

Advertencia: Advierte contra una acción que pudiera resultar en lesión corporal o la muerte.

Warnhinweis: Warnung vor Handlungen, die zu Verletzung von Personen oder gar Todesfällen führen können!

Commonly Used Acronyms

The following acronyms are used extensively throughout this guide:

- IOM – Input/Output Module
- FM – Fabric Module
- CM – Control Module
- LED – Light Emitting Diode
- XFP – 10-Gigabit Small Form Factor Pluggable fiber-optic transceiver
- SFP – 1-Gigabit Small Form Factor Pluggable fiber-optic transceiver
- SMF – Single Mode Fiber
- MMF – Multimode Fiber
- WWDM – Wide-Wavelength-Division Multiplexed
- USB – Universal Serial Bus
- ESD – Electrostatic Discharge

Getting Help

For additional support related to the X4-C or this document, contact Enterasys Networks using one of the following methods:

World Wide Web	www.enterasys.com/services/support/
Phone	1-800-872-8440 (toll-free in U.S. and Canada) or 1-978-684-1000 For the Enterasys Networks Support toll-free number in your country: www.enterasys.com/services/support/contact/
Internet mail	support@enterasys.com To expedite your message, please type **[X-Series]** in the subject line.

To send comments or suggestions concerning this document to the Technical Publications Department:

techpubs@enterasys.com

To expedite your message, include the document Part Number in the Email message.

Before contacting Enterasys Networks for technical support, have the following data ready:

- Your Enterasys Networks service contract number
- A description of the failure
- A description of any action(s) already taken to resolve the problem (for example, changing mode switches or rebooting the unit)
- The serial and revision numbers of all involved Enterasys Networks products in the network
- A description of your network environment (such as layout, cable type, other relevant environmental information)
- Network load and frame size at the time of trouble (if known)
- The device history (for example, if you have returned the device before, or if this a recurring problem)
- Any previous Return Material Authorization (RMA) numbers

1

Overview

This chapter describes the following:

For information about:	Refer to page ...
System Description	1-1
Features	1-3

System Description

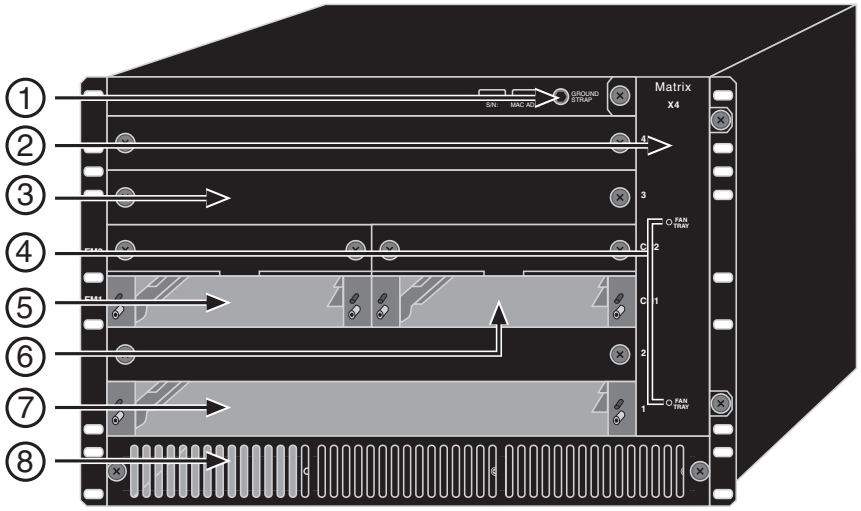
The Matrix X4-C chassis design provides eight slots to seat four Input/Output Modules (IOM), two Fabric Modules (FM), and two Control Modules (CM).

The Matrix X4-C chassis supports:

- Terabit switching capacity
- Hot swapping of modules
- Redundant power and cooling systems
- Installation in a standard 19-inch (48.26-centimeter) wide rack (six chassis can be loaded into a standard 7-foot [213.36-centimeter] high rack)
- Protective earth grounding requirements of the National Electrical Code (NEC) UL 60950 and IEC 60950 standards
- Telcordia GR-1089 Section 9, Bonding and Grounding Requirements, when required

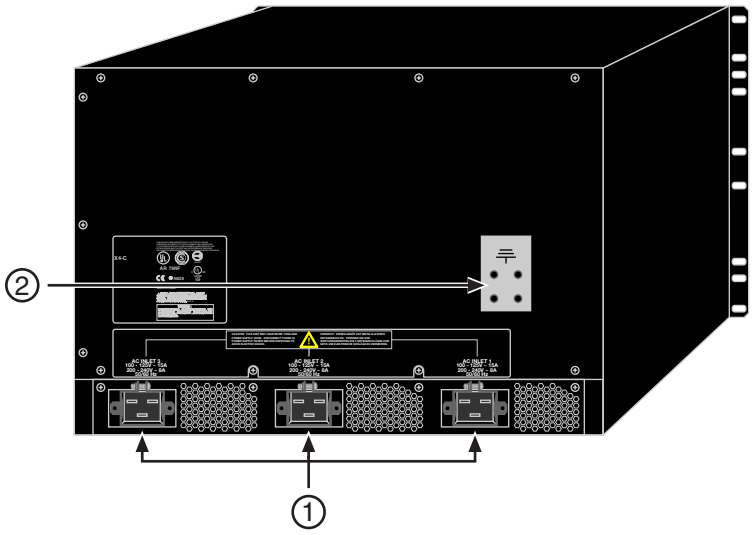
All chassis components (power supplies, fan tray, and modules) are installed from the front of the chassis for ease of maintenance. All LED indicators are observable from the front of the chassis to aid in monitoring network operational status and performing maintenance. Figure 1-1 illustrates the Matrix X4-C chassis (front view) as shipped from the factory with coverplates removed from all slots labeled *1* including *CM1*, *FM1*, *PS1,* the first IOM and fan tray slots. Figure 1-2 illustrates the rear of the chassis showing AC power inlets 1 through 3 and earth grounding holes.

Figure 1-1 Matrix X4-C Chassis with Redundant Power Supplies



1 Ground strap receptacle
2 Fan tray bezel
3 IOM coverplate
4 Fan tray LEDs
5 Fabric Module slot (FM1)
6 Control Module slot (CM1)
7 IOM slot 1
8 Power supply vent cover

Figure 1-2 Matrix X4-C Chassis as Shipped (Rear View)



1 AC power supply inlets (3) with cord lock brackets
2 Earth grounding holes

Features

The following sections provide an overview of the system features.

X4-C Input/Output Modules

The Matrix X4-C chassis supports Input/Output Modules (IOM) which perform all system packet forwarding. The X4-C provides four slots to install the IOMs.

Physical connectors for these Ethernet IOMs include:

- Single and Multimode Fiber (SMF, MMF), 10-Gigabit Form Factor Pluggables (XFP)
- SMF/MMF, 1-Gigabit Form Factor Pluggables (SFP)

Supported transceivers for XFP and SFP connectors are:

- Serial MMF at 850 nm wavelength with a 65-meter (213-foot) reach
- WWDM (Wide-Wavelength-Division Multiplexed) and MMF at 1310 nm wavelength with a 300-meter (984-foot) reach
- WWDM and Serial SMF at 1310 nm wavelength with a 10-kilometer (6-mile) reach
- Serial SMF at 1550 nm wavelength with a range of 80 kilometers (49.7 miles)
- Copper, 1000BASE-T 1.25 GBd at 1550 nm wavelength with a 100-meter (328-foot) reach

IOMs are equipped with the IBM PowerPC 440GX, 600 GHz processor and 512 MB of memory. Each module also provides 512 KB of FLASH which stores the POST diagnostics and system boot code. An EEPROM stores from 2 to 48 IEEE MAC addresses, depending on the number of physical interfaces per IOM, and manufacturing data.

X4-C Control Module

The X4-C provides a Control Module (CM) to centrally control the system. This module hosts the management software and protocols for system operations. A second slot is available to install an optional CM for a redundant, high availability configuration. When in tandem, the CMs are set to either Active or Standby state, which is determined by the CMs themselves by means of an internal algorithm. The CMs communicate across two channels with one reserved as a high-availability link.

CMs are equipped with the Pentium M 1.66 GHz processor and include 1 GB of memory upgradeable to 4 GB.

The CMs can be hardware reset—similar to a power recycle—using the RESET button on the front panel.

A 1-GB Compact FLASH card is provided on the CM to store multiple system boot images and a minimum of two configuration files. For information about downloading firmware and software, refer to the *Matrix X Router Configuration Guide*. The chassis serial number and 4 MAC addresses are not stored in the CM, but on a Chassis PROM which is on the chassis backplane and not the control module. For redundancy, there are two Chassis PROMs per chassis.

The CM also provides one USB port, two RJ45 ports—one Ethernet for management, and one Console (COM) port for serial connections. The USB port is useful for fast downloading of configuration files, while the Ethernet port is useful as a network management interface, for example, on a chassis where all the interfaces are 10-Gigabit Ethernet. The Ethernet interface also

supports Access Control Lists (ACLs) and, by default, is associated with the VPN Routing/ Forwarding (VRF) instance that all interfaces are assigned to. Be aware of the following caveats, however, when using this interface:

- IGP and EGP routing protocols do not export routes
- Bridging is not supported

The Console port is considered the primary CLI interface, and is useful for reading startup and diagnostic messages, event logging, and many other tasks.

The CM supports up to 18 Telnet or SSH sessions which may be built on any module interface. Refer to the *Matrix X Router Configuration Guide* for more information.

Installing Redundant CMs into an Active Matrix X Router

Caution: Do not remove an active CM that is in the process of synchronizing with a standby CM. This can potentially cause loss of the system's startup configuration.

Precaución: No quite el CM activo que esté en el proceso de sincronizar con un CM redundante. Esto puede causar una pérdida de la configuración del arranque de sistema.

To ensure redundant CM installation in an active system is performed correctly, perform the following steps:

1. Verify that the active CM is up by entering the **show system hardware** command. For example, if the active CM is in slot 1, the following output (partial) will display:

```
matrix-x(switch-su)-> show system hardware cm 1

CM SLOT 1

   Model:                        CM Version 1.0
   State:                        Active
   ...
```

2. Back up your existing configuration with the **show config outfile** command. For example, to copy the file *Feb25.cfg* you created that contains the current running configuration on your system, type the following:

```
matrix-x(switch-su)-> show config outfile public/Feb25.cfg
```

   The configuration is saved in the file *Feb25.cfg* in the public/ directory on both the active and standby CMs.

3. Optionally, copy the file you just created to the local/ directory on both the active and standby CMs. The local/ directory is a non-replicated backup area that can be used to store files that you want to keep during a firmware upgrade or downgrade, since an upgrade or downgrade may wipe out the public directory.

```
matrix-x(switch-su)-> copy public/feb25.cfg local/Feb25.cfg
matrix-x(switch-su)-> copy public/feb25.cfg standby:local/feb25.cfg
```

4. Copy the backup configuration file to a remote location using the **copy** command. For example, to copy the *Feb25.cfg* file to a remote site using FTP, type the following:

```
matrix-x(switch-su)-> copy public/Feb25.cfg ftp://usergina@10.10.10.10/
scripts/Feb25.cfg
```

5. Insert the standby CM into the system and **wait until it is fully synchronized** with the active CM before removing the active CM. Do not physically remove the active CM during the synchronization process. The following message will appear on your console screen:

```
MXS Standby: Synchronization monitoring system



MXS CM Standby: SYNCING DATA. Do not remove the Active CM

   configuration data 124 MB  Copying 10.4%(2006 KBPS)00m56s remain
high-availability data256 MB  Copy-Pending
```

6. To manually check the state of the synchronization process, enter the **show system high-availability** command which will display the following output:

```
matrix-x(switch-su)-> show system high-availability

SYSTEM HIGH-AVAILABILITY INFORMATION
------------------------------------

System Coldstart:                    Wed Mar  9 12:28:24 2005
Current Time:                        Wed Mar  9 18:36:06 2005
Total System Uptime:                 0d06h07m42s
HA-Channel:                          Primary - Online
Configuration:                       Non-Redundant (Coldstart after Reboot)
Total Failovers Since Coldstart:     0
Early Repetitive Failure Protection: 10m00s, 00n45s remain
Active Module:                       CM1
Standby Module:                      Synchronizing

CONTROL MODULE INFORMATION
------------------------------
CM1    In-Service   Active          Uptime:0d00h54m08s  1.3.2.N
CM2    In-Service   Standby

Replication Status:
-------------------------------
configuration data     124 MB  Copying 10.4%(2006 KBPS)00m56s remain
high-availability data 256 MB  Copy-Pending

The following conditions are preventing a Hot-Redundant configuration:
-------------------------------
* Hot-Failover is disabled
* Early repetitive failure protection timer has not expired
* Synchronizing configuration data
* Synchronizing high-availability data
```

After a few minutes this message will appear on the Standby Control Module indicating synchronization is complete:

```
MXS Standby: Availability monitor    Wed Jan 10 10:26:00 2007

   MXS CM Hot In-Service Standby: Waiting for failover
      Total System Uptime: 23d14h08m12s
```

7. Again, you can enter the **show system high-availability** command to verify synchronization is complete and the standby CM is up. Note in the output that the Standby Module status has changed from *Synchronizing* to *In-Service*.

```
SYSTEM HIGH-AVAILABILITY INFORMATION
-----------------------------------

System Coldstart:                    Wed Mar  9 12:28:24 2005
Current Time:                        Wed Mar  9 18:36:06 2005
Total System Uptime:                 0d06h07m42s
HA-Channel:                          Primary - Online
Configuration:                       Warm-Redundant (Failover = Coldstart)
Total Failovers Since Coldstart:     0
Early Repetitive Failure Protection: 10m00s, Expired

CONTROL MODULE INFORMATION
------------------------------
CM1    In-Service    Active          Uptime:0d00h54m08s  1.3.2.N
CM2    In-Service    Standby         Uptime:0d00h05m36s  1.3.2.N

MONITOR VALUES
------------------------------
Scan Interval:                 60s   (default)
In-use memory threshold:       85%   (default)
Memory change delta:        10240KB  (default)
Cpu Usage threshold:          80.0%  (default)
```

Be aware that if the active CM resets during the synchronization (for example, due to a software fault, operator command, power-loss, or other system problem), you do not need to take action. The system will fully recover on its own during the next system restart, assuming that both CMs are left installed in the chassis. However, physically removing the active CM during the process may cause configuration data loss.

Proper CM Recovery

If you want to ensure that a certain configuration wins arbitration over another after a "physical loss," the solution is to allow the CM it is stored on to become active *first*. This can be accomplished in one of two ways:

1. Install only one CM in the chassis.
2. Do not allow the other CM to boot until after the good CM has declared itself active.

For example, say the mistake you made was to reinsert an installed CM (*CMa* in an originally single CM chassis) back into the running system knowing that there was already an active CM (*CMb*) running. One solution would be to physically remove CMb, insert CMa, allow it to become active, then insert CMb. The configuration contained on CMa will then be restored.

X4-C Fabric Module

The Matrix X4-C provides a Fabric Module (FM) which connects multiple IOMs to form an integrated system. Current IOMs require dual FMs to support line rate traffic. Both are in Active mode.

X4-C Redundant Power Supplies

The Matrix X4-C chassis supports up to three power supplies that install on the bottom of the chassis, in slots labeled PS1 through PS3. While the chassis can operate with fewer than three power supplies installed depending upon the number of installed IOMs, FMs, and CMs, additional power supplies provide redundancy and load sharing.

Each power supply (X-AC) requires a dedicated 100-240 Vac, 20 Amp earth-grounded circuit. Power cords shipped with this unit are country-dependent. Each power cord must be plugged into an independent power circuit.

Each power supply has its own cooling fans.

The power supplies are capable of load sharing (+/- 5%) the Matrix X4-C chassis power load. If one power supply fails, the other power supplies support a minimally loaded chassis (1 IOM, 1 FM, and 1 CM) without interruption to network traffic. Refer to "Site Guidelines" on page 2-1 and "Power Supply Requirements, Specifications, and Twist Lock Options" on page A-2 for power outlet requirements.

As an option, you can purchase twist lock power cords which securely attach the rear power inlets to the power outlets. Refer to Table A-6 on page A-3 to select the correct receptacle type required to utilize this cord for your chassis.

Power Supply LEDs

Each power supply comes equipped with two LEDs for at-a-glance diagnostics that indicate individual AC and DC power supply status. Refer to "Power Supply LEDs" on page 3-38, for more information.

Auto-Ranging Power Supplies

The Matrix X4-C chassis power supplies automatically adjust to the input voltage and frequency, which allows for an input voltage of 100 to 240 Vac, and a frequency between 50 and 60 Hz. See the operating specifications in Appendix A, **Specifications and Regulatory Compliance**. No additional adjustments are necessary. For installations in North America, a 20 Amp power cord is required. See "Powering Up the Matrix X4-C Chassis" on page 3-37 for more details.

Power Supply Replacement

To limit network downtime, a power supply may be removed after it has been powered down without powering down the chassis. When more than one power supply is installed, this allows you to remove one power supply without interrupting network traffic.

X4-C Cooling System

The X4-C features two (X-FAN) removable fan trays accessible from the front of the unit. These four-fan units are hot swappable, so they can be replaced without powering down the chassis. Each fan tray has one LED located on the front of the unit, indicating its status (normal/fault/off). Refer to "Fan Tray LED" on page 3-39 for a full description of the fan tray LED states.

On the X4-C, the fans push cooling air through the chassis and modules, from right to left, exhausting out the other side of the chassis.

Rack-Mountable Chassis

The Matrix X4-C chassis is designed to be mounted in a standard 19-inch (48.26-centimeter) wide equipment rack (six chassis can be loaded into a standard 7-foot [213.36-centimeter] high rack). Optional bottom shelving and mid-mount brackets are available for non-standard circumstances.

Refer to “Site Guidelines” on page 2-1 for requirements on ventilation and cooling.

2

Site and Configuration Guidelines

This chapter describes the following:

For information about:	Refer to page ...
Site Guidelines	2-1
Configuration Guidelines	2-2

Electrical Hazard: Only qualified personnel should install or service this unit.

Riesgo Eléctrico: Solamente personal capacitado debe de instalar o darle servicio a esta unida.

Elektrischer Gefahrenhinweis: Installationen oder Servicearbeiten sollten nur durch ausgebildetes und qualifiziertes Personal vorgenommen werden.

Site Guidelines

The following guidelines must be followed when a site is selected for the Matrix X4-C chassis. If guidelines are not followed, network performance may be unsatisfactory.

- To allow proper cooling, allow 5.08 centimeters (2 inches) of clearance on either side of the chassis.
- Ensure that the rack used to install the Matrix X4-C chassis can support the unit and that the rack remains stable.
- The AC power supplies for the Matrix X Router chassis require three-pronged power receptacles capable of delivering the current and voltage specified in "Power Supply Requirements, Specifications, and Twist Lock Options" on page A-2. One 20-Amp, earth-grounded AC outlet on independently-fused circuits is required for each power supply, and must be located within 182 centimeters (6 feet) from the site. Power cords and outlet types are country-specific. In the United States, three power cords with NEMA 5-20P plugs are provided separately.
- Ambient temperature at the installation site must be maintained between 5° and 40°C (41° to 104°F). Temperature changes must be maintained within 10°C (18°F) per hour.

Configuration Guidelines

The Matrix X4-C chassis provides eight slots that accept modules. IOM (Input/Output Module) slots are numbered 1 through 4 from bottom to top. Two Fabric Module slots, labeled FM1 and FM2, are located in the middle-left of the chassis, and to their right, Control Module slots CM1 and CM2.

The three slots located at the base of the chassis are reserved for power supplies. Lastly, two Fan Tray slots occupy the right side of the chassis.

3

Matrix X4-C Chassis Setup

This chapter describes the following:

For information about:	Refer to page ...
Required Tools	3-1
Unpacking the Matrix X4-C Chassis	3-2
Setting Up the Matrix X4-C Chassis	3-5
Installing and Removing a Power Supply	3-11
Installing and Removing a Fan Tray	3-16
Installing and Removing Modules	3-18
Attaching Cables, Installing Compact Flash Card and DIMM Upgrade Kit	3-24
Optional Cable Management Kit	3-35
Powering Up the Matrix X4-C Chassis	3-37
LEDs and Reset Button	3-37
First-Time Quick Configuration	3-42

Required Tools

Installation equipment needed includes:

- Box cutter
- Phillips screwdriver
- Flat blade screwdriver

Electrical Hazard: Only qualified personnel should install or service this unit.

Riesgo Eléctrico: Solamente personal calificado debe realizar procedimientos de instalacion.

Elektrischer Gefahrenhinweis: Installationen sollten nur durch ausgebildetes und qualifiziertes Personal vorgenommen werden.

A box cutter is required to cut the shipping straps. A Phillips screwdriver is needed to install the unit in a standard 19-inch (48.26-centimeter) equipment rack and to install the optional Cable Management Kit (refer to "Optional Cable Management Kit" on page 3-35). A flat blade screwdriver is used to tighten and loosen captive screws. Refer to Chapter 2, **Site and Configuration Guidelines**, for guidelines that must be followed to install the Matrix X4-C chassis.

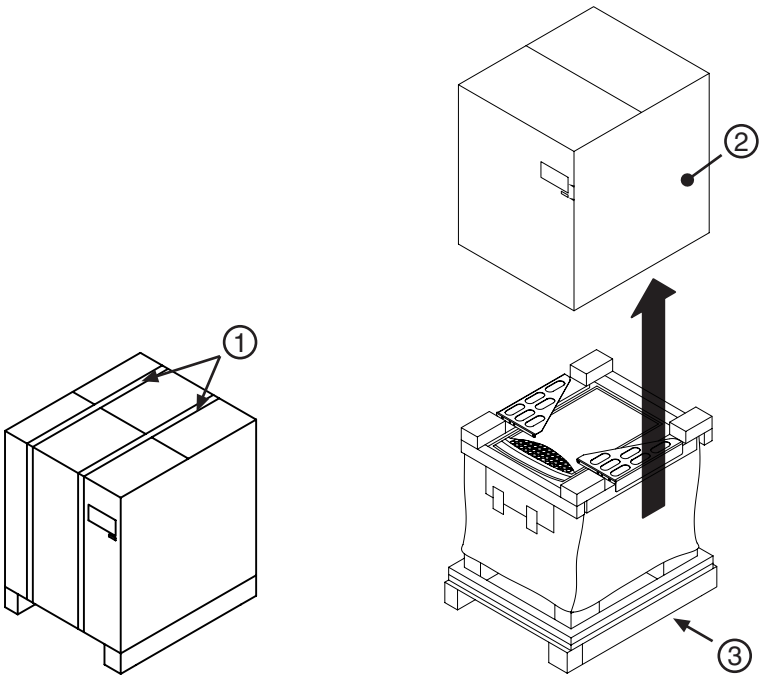
Unpacking the Matrix X4-C Chassis

Note: Unpack the Matrix X4-C chassis components only as needed. Leave the components in their respective shipping cartons until you are ready to install that component. Save all shipping materials in the event you must repack the chassis.

The Matrix X4-C chassis is packed and shipped on a skid. Before unpacking the chassis, examine the outside packaging for obvious damage. To unpack the Matrix X4-C chassis, refer to the following figures which illustrate disassembly and include numbers that correspond to the steps below. Proceed as follows:

1. With a box cutter, cut the two shipping straps fastening the corrugated box to the skid, as shown in Figure 3-1.
2. Lift and remove the shipping box from the skid.

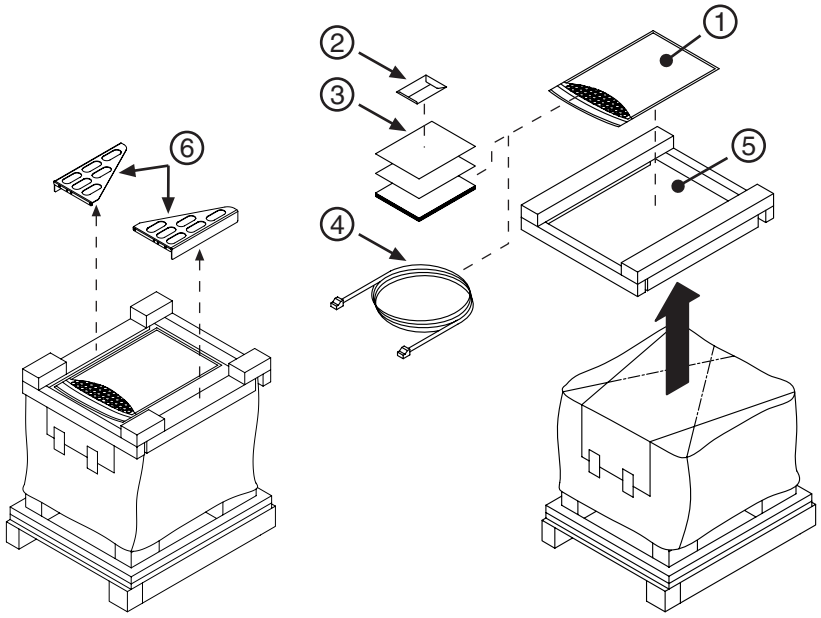
Figure 3-1 Disassembly Steps 1 and 2



1 Shipping straps **2** Shipping box **3** Shipping skid

3. Remove and save the rack support brackets, accessory package, documents, cable and other equipment from the top of the styrofoam cap, as shown in Figure 3-2 on page 3-3. Accessories and packing equipment include:
   - Electrostatic Discharge (ESD) wrist strap
   - Rack support brackets
   - Installation documentation
   - Screw assemblies
   - RJ45 management cable
4. Lift and remove the styrofoam cap from the top of the chassis. Save for reshipping, if necessary.

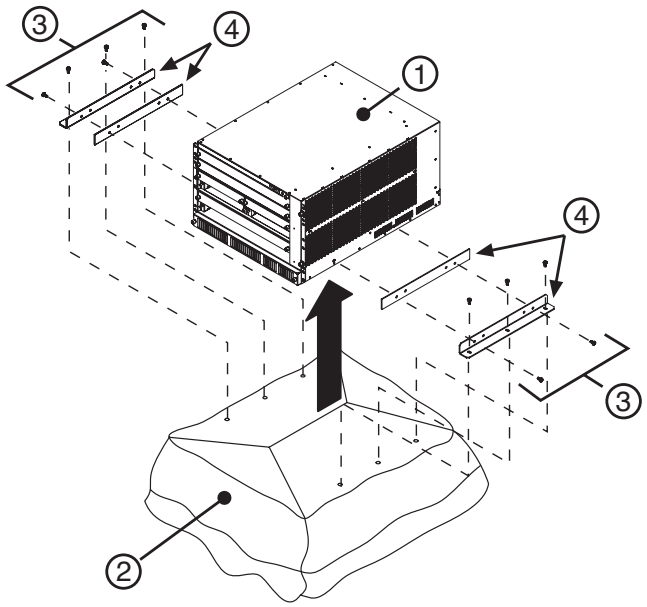
Figure 3-2 Disassembly Steps 3 and 4



1	Accessory package	**3**	Documentation	**5**	Styrofoam cap
2	Screw packet	**4**	RJ45 management cable	**6**	Rack support brackets (2)

5. Open the top of the shipping bag covering the unit, then pull the bag down around the skid, as shown in Figure 3-3.

Figure 3-3 Disassembly Steps 5 through 8



1	Chassis	**2**	Shipping bag and skid	**3**	Shipping screws (10)	**4**	Shipping brackets (4)

6. Remove and save (for later use) the screws fastening left and right shipping and support brackets to the chassis and the skid.
7. Lift and remove the chassis from the skid.
8. Save the plastic bag and skid for future reshipping, if necessary.
9. Be aware that the following peripherals ship separately:
   - IOMs
   - CMs
   - FMs
   - Fan trays
   - Power supplies and 20-Amp line (inlet) cords (one per power supply)
   - Twist lock power cords
   - Mid-mount brackets (2)

Note: To reship the chassis, refer to the directions above and reverse each step. Ensure that all shipping brackets are used.

Setting Up the Matrix X4-C Chassis

The following sections describe the procedures that must be followed to complete chassis installation. Chassis are shipped with all slots labeled "1" open. Coverplates over IOM slot 1, Fabric and Control Module slot 1, fan tray slots 1 and 2, and PS1 (power supply) are removed, and the slots are ready for module installation.

Setup Order

Once a suitable site has been chosen, proceed to install the Matrix X4-C chassis in a rack. It is recommended that the Matrix X4-C chassis installation proceed in this order:

1. Mount the chassis to a 19-inch (48.26-centimeter) rack or other secure location. Refer to "Installing the Matrix X4-C Chassis" on page 3-5.
2. Perform chassis bonding and grounding. Refer to "Chassis Bonding and Grounding" on page 3-9.
3. Attach the Electrostatic Discharge wrist strap. Refer to "Attaching the Electrostatic Discharge Wrist Strap" on page 3-11.
4. Install power supply module(s). Refer to "Installing and Removing a Power Supply" on page 3-11.
5. Install fan trays. Refer to "Installing a Fan Tray" on page 3-16.
6. Install IOMs, Fabric Modules, and Control Modules. Refer to "Installing and Removing Modules" on page 3-18.
7. Attach cabling to the cable management panels. Refer to "Attaching Cables, Installing Compact Flash Card and DIMM Upgrade Kit" on page 3-24.
8. Install the optional Cable Management Kit, if purchased, and gather and wrap cables in the velcro cable straps. Refer to "Optional Cable Management Kit" on page 3-35.
9. Locate and learn the function of IOM, CM, and FM LEDs and the Reset button. Refer to "LEDs and Reset Button" on page 3-37.
10. Minimally configure the X4-C chassis to get it up and running and ready for more extensive software configuration. Refer to "First-Time Quick Configuration" on page 3-42.

Installing the Matrix X4-C Chassis

The Matrix X4-C chassis is designed to be mounted in a standard 19-inch (48.26-centimeter) equipment rack or cabinet. Use the following guidelines to mount the chassis:

- Allow at least 30.96 centimeters (12.19 inches) of clearance in front of the rack for chassis installation.
- Install the following *optional* rack supports:
  - Rack support brackets are optional but *recommended* for four-post cabinet installations.
  - Mid-mount brackets are optional but *recommended* for two-post racks (support for shorter racks).
- Attach the Matrix X4-C chassis ears to the rack.
- Install grounding cables, as necessary.

Installing Optional Rack Support Brackets

Rack support brackets are shipped with the chassis for additional support underneath the chassis. They are recommended for installations with four-post cabinets to augment standard rack support by the front ears on the chassis. To install the rack support brackets, proceed as follows:

Warning: If the rack is not secured to the floor, it is recommended that you install the chassis in the bottom half of the rack. This helps prevent the rack from being top heavy.

Advertencia: Si el rack no esta asegurado al piso, es recomendable que instales el chasis en la parte de abajo del rack. Esto ayuda a prevenir que el rack este demasiado pesado en la parte superior.

Warnhinweis: Falls das Rack nicht mit Schrauben am Boden gesichert wird, sollte das Chassis in der unteren Hälfte des Racks installiert werden, um ein kippen des Racks zu vermeiden.

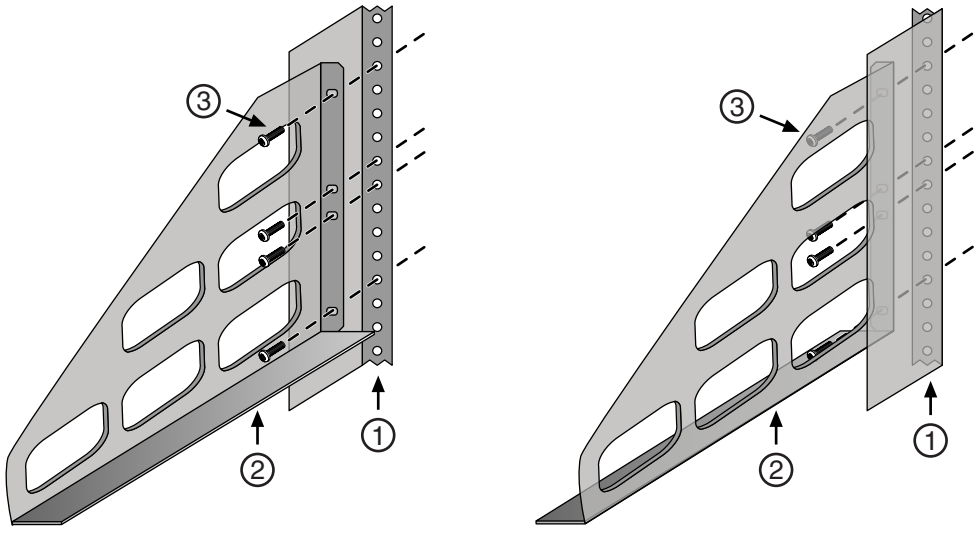
Warning: Before rack-mounting the device, ensure that the rack can support it without compromising stability. Otherwise, personal injury and/or equipment damage may result.

Advertencia: Antes de montar el equipo en el rack, asegurarse que el rack puede soportar su peso sin comprometer su propia estabilidad, de otra forma, daño personal o del equipo puede ocurrir.

Warnhinweis: Überzeugen Sie sich vor dem Einbau des Gerätes in das Rack von dessen Stabilität, ansonsten könnten Personenschäden oder Schäden am Gerät die Folge sein.

1. Keeping the above notes in mind, locate the position on the rack where you will install the brackets. The chassis requires 61.85 centimeters (24.35 inches) of vertical spacing.
2. Align the holes in one bracket with those in the rack, as shown in Figure 3-4, then fasten it to the rack from the inside of the bracket using four of the screws supplied with the rack.
3. Install the second bracket with four more screws, attaching them from the inside of the rack, and proceed with *optional* mid-mount bracketing or "Rack Mounting the Matrix X4-C Chassis" on page 3-8.

Figure 3-4 Installing Rack Support Brackets



1 Rack **2** Rack support brackets (2) **3** Bracket screws (8)

Installing Optional Mid-Mount Brackets

You can purchase an optional mid-mount bracket kit (X4-MBRKT) for a rack or cabinet when the standard front-chassis ear attachment is unusable due to space or weight-support concerns. To install the brackets, proceed as follows:

Warning: If the rack is not secured to the floor, it is recommended that you install the chassis in the bottom half of the rack. This helps prevent the rack from being top heavy.

Advertencia: Si el rack no esta asegurado al piso, es recomendable que instales el chasis en la parte de abajo del rack. Esto ayuda a prevenir que el rack este demasiado pesado en la parte superior.

Warnhinweis: Falls das Rack nicht mit Schrauben am Boden gesichert wird, sollte das Chassis in der unteren Hälfte des Racks installiert werden, um ein kippen des Racks zu vermeiden.

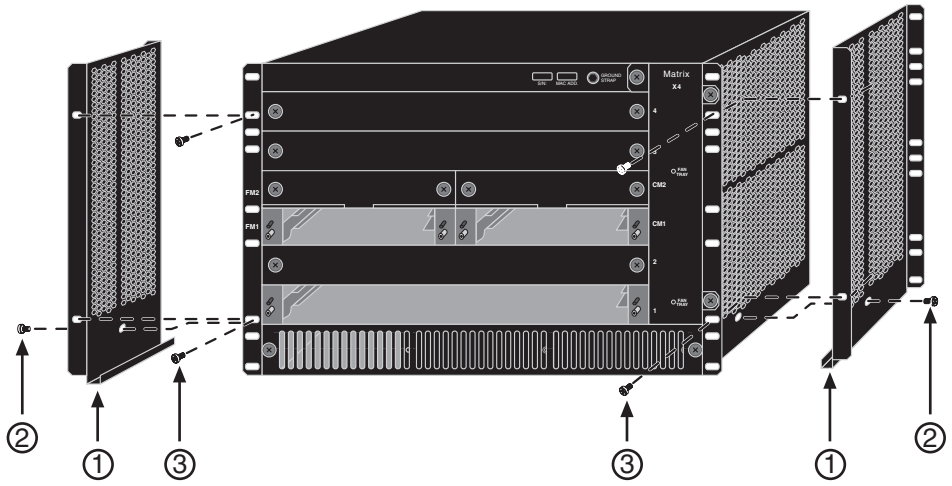
Warning: Before rack-mounting the device, ensure that the rack can support it without compromising stability. Otherwise, personal injury and/or equipment damage may result.

Advertencia: Antes de montar el equipo en el rack, asegurarse que el rack puede soportar su peso sin comprometer su propia estabilidad, de otra forma, daño personal o del equipo puede ocurrir.

Warnhinweis: Überzeugen Sie sich vor dem Einbau des Gerätes in das Rack von dessen Stabilität, ansonsten könnten Personenschäden oder Schäden am Gerät die Folge sein.

1. Keeping the above notes in mind, locate the position on the chassis where you will install the brackets. The chassis requires 61.85 centimeters (24.35 inches) of vertical spacing.
2. Align the holes in one bracket with those in the chassis ears, as shown in Figure 3-5, then fasten it to the chassis using two of the screws supplied with the bracket kit. Insert the third screw in the hole at the bottom of the bracket and attach to the chassis.
3. Install the second bracket as described earlier, using the three remaining screws.

Figure 3-5 Fastening Mid-Mount Brackets



1 Mid-mount brackets (2) **2** 1/4-20 chassis screws (2) **3** #10 ear screws (4)

Rack Mounting the Matrix X4-C Chassis

Note: Read Chapter 2, **Site and Configuration Guidelines**, before completing the following procedure to ensure that all installation guidelines are met.

To rack-mount the Matrix X4-C chassis, proceed as follows:

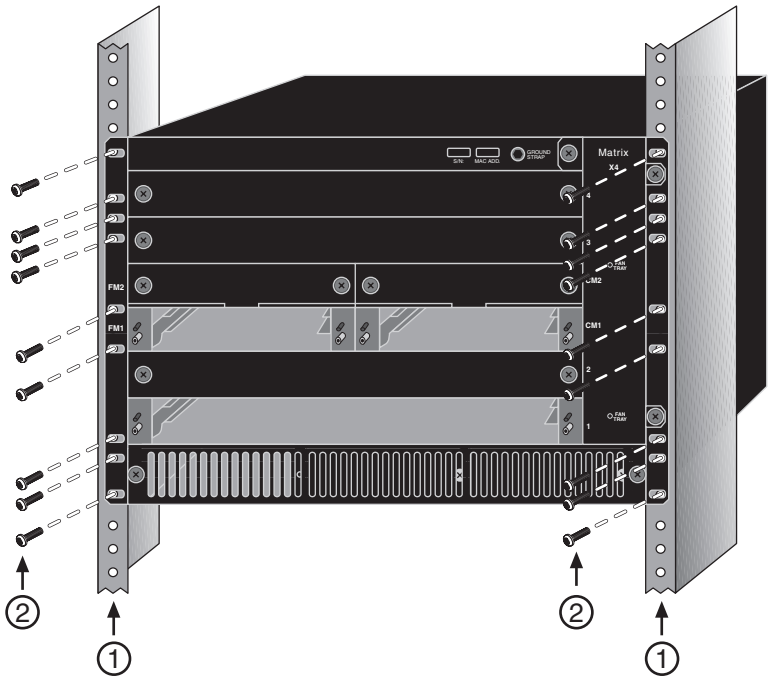
Warning: We recommend you use a forklift or other mechanical device to lift and hold the chassis.

Advertencia: Para ayudar a prevenir alguna lesión personal, es recommendable que un elevador de carga or algun otro dispositivo se utilice para levantar el chasis.

Warnhinweis: Zum Schutz vor körperlichen Schäden, es wird empfohlen, mittels Gabelstabler oder anderen Hilfsmittein das Chassis anzuheben oder es zu halten.

1. If you installed the optional mid-mount brackets, skip to Step 3.
2. Lift the chassis onto the support brackets and use 18 screws (nine per side) to secure the chassis to the rack. As shown in Figure 3-6, start with the bottom holes and work toward the top of the chassis. Chassis rack mounting is now complete.

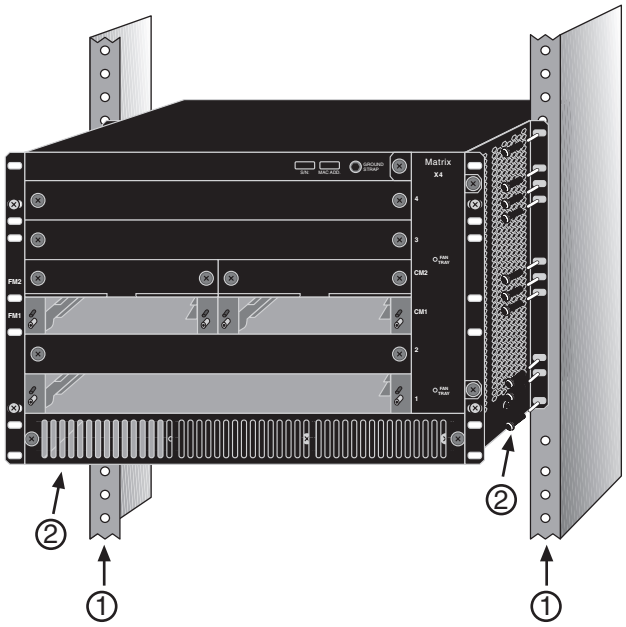
Figure 3-6 Rack Mounting the Matrix X4-C Chassis



1 Rack **2** Rack-mounting screws (9 per side)

3. Using 20 screws, attach the mid-mounted chassis to the rack, as shown in Figure 3-7.

Figure 3-7 Rack Mounting the Mid-Mounted Chassis



1 Rack **2** Rack-mounting screws (10 per side)

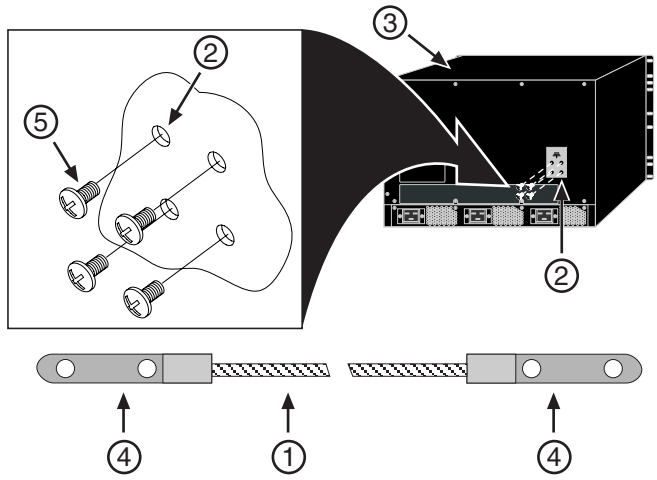
4. Chassis rack mounting is now complete.

Chassis Bonding and Grounding

Installing the chassis as described in this chapter meets the protective earth grounding requirements of the National Electrical Code (NEC) UL 60950 and IEC 60950 standards. However, in some cases it is necessary to use an alternative grounding method at installation sites that must meet the Telcordia GR-1089 Section 9, Bonding and Grounding Requirements or national deviations.

To meet these requirements, use the four tapped holes located on the rear-center of the chassis. These holes meet the hole grounding bolt pattern requirements, as shown in Figure 3-8.

Figure 3-8 Telcordia GR-1089 Grounding Hole Pattern and Cable



1 12 AWG stranded copper wire
2 Rear of chassis, bolt pattern grounding site
3 Chassis
4 Two-hole connectors
5 1/4-20 ground screws (4)

To ground the chassis according to the Telcordia GR-1089 Section 9, Bonding and Grounding Requirements, a connection is needed between the chassis and the enclosure metalwork or a nearby point on the Central Office (CO) Ground system. The connection is made using one or more grounding wires (as needed) fabricated from a 12 AWG stranded copper wire. To fabricate and install a grounding wire, proceed as follows:

1. Cut a 12 AWG stranded-copper wire to length, long enough to reach from the grounding location of the chassis to the selected grounding location on the CO Ground or enclosure metalwork.
2. Install a listed two-hole compression-type connector on both ends of the grounding wire.
3. Apply a suitable antioxidant to the chassis grounding location and unpainted surface grounding location on the CO Ground or enclosure metalwork.
4. Connect one ground cable two-hole connector to the chassis using two of the 1/4-20 screws shipped with the chassis. Connect the two-hole connector at the other end of the cable to the CO Ground or enclosure metalwork using user-supplied screws.
5. Torque screws to 67 in-lbs (± 5%).

Notes: The hole pattern in the chassis allows you to use two differently-sized two-hole connectors, determined by the orientation of the connector. Vertical and horizontal orientations allow for two standard double-hole compression ground lug configurations.

In Norway, Sweden, and Finland, the same procedure can be used for a permanent protective earth ground connection as required by their national deviation from IEC 60950, Section 5.1.7.

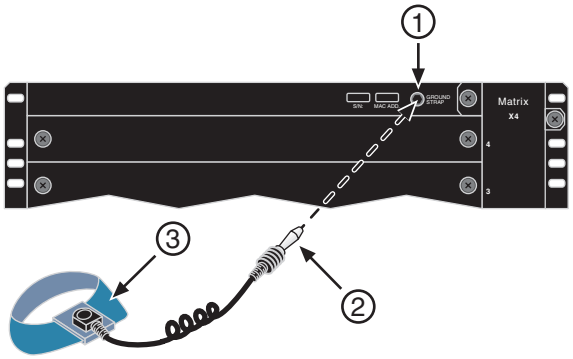
In Denmark, the chassis must be installed utilizing a Type B grounded plug.

Attaching the Electrostatic Discharge Wrist Strap

The Electrostatic Discharge (ESD) wrist strap must be attached before handling the power supplies, fan tray, and modules used in the Matrix X4-C chassis.

Place the ESD wrist strap on your wrist and plug the other end into the grounding receptacle, shown in Figure 3-9, near the bottom of the chassis.

Figure 3-9 ESD Grounding Receptacle



1 Grounding Receptacle **2** Plug **3** Wrist strap

Installing and Removing a Power Supply

Matrix X AC power supplies are supported in all Matrix X chassis models and provide two power output levels relative to the input power source. The power supplies support either 110 Vac 20A or 220 Vac 10A service, providing 1160 or 1500 Watts per power supply, depending upon the electrical infrastructure of the site where the Matrix X chassis will be located.

Because system components consume varying amounts of electrical power, we recommend consulting the module power specifications in "Power Supply Requirements, Specifications, and Twist Lock Options" on page A-2 to guide you in installing the proper number of power supplies for your configuration.

As you add modules to the Matrix X4-C chassis, you may be required to install more power supplies. Additional power supplies can be installed to provide redundancy. This would require incremental power be added to the base power requirements of the chassis and its components, depending on the power redundancy you want to support.

When at least two power supplies are installed, the power from each is evenly distributed. If one power supply fails, the second power supply assumes the load. Additional modules share the load as required.

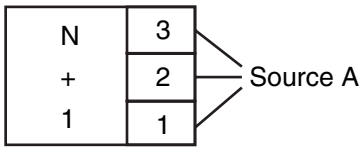
Be aware that when you receive your Matrix X4-C chassis, a coverplate will be in place over all power supply slots except PS1 on the left. This slot is left open for your convenience when installing the first power supply.

Power Supply Planning

Although each power supply requires its own circuit, when planning the X4-C power budget you have the option of drawing from one or more sources by either the *N + 1* or *1 + 1* method, respectively.

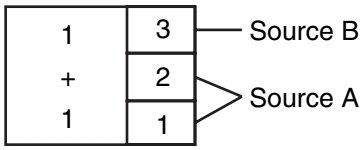
Drawing power by the N + 1 method protects the X4-C against the failure of a single power source although not against an *outage* by that source. In a scheme where three modules are installed, as shown in Figure 3-10, you can assign all three modules to source "A." This is the most common approach to power supply planning.

Figure 3-10 Power Supply Planning: N + 1 Method



Alternately, drawing power by the 1 + 1 method has the advantage of protecting the X4-C against an outage by one of the power sources as well as the failure of one or as many as half of your power supplies. However, this method requires either a backup battery or another power source separate from the first power source. As shown in Figure 3-11, three power supplies are installed with two assigned to source "A" and the other to source "B."

Figure 3-11 Power Supply Planning: 1 + 1 Method



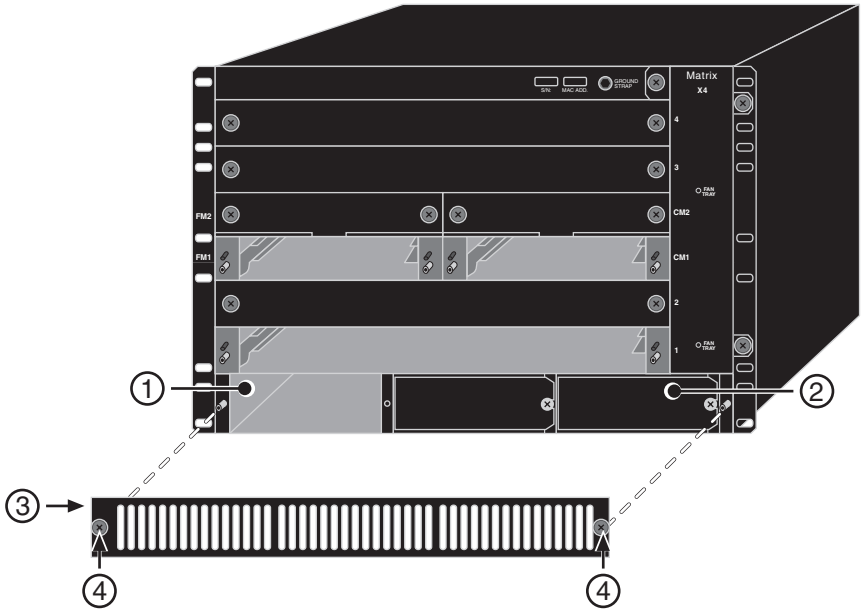
Installing a Power Supply

Power supplies are installed in slots located at the base of the chassis, as shown in Figure 3-12. If you intend to install only a single power supply, it can be installed in any of the slots labeled PS1 to PS3 in the chassis although the PS1 slot is left open for your convenience.

To install power supplies in the Matrix X4-C chassis, refer to the following figures and proceed as follows:

1. Unpack the power supply by removing it from its shipping box and stripping the packing material. (Save the shipping box and materials in the event the unit must be reshipped.)
2. Remove the power supply from its protective wrapping.
3. Examine the power supply carefully, checking for damage. If any damage is noted, *do not* install the power supply. Contact Enterasys Networks for instructions.
4. Locate the ESD wrist strap shipped with the Matrix X4-C chassis. Attach the ESD wrist strap to your wrist and plug the cable from the ESD wrist strap into the ESD grounding receptacle at the bottom of the chassis as shown in Figure 3-9.
5. Remove the vent plate covering all power supply slots by loosening the side captive screws, as shown in Figure 3-12.

Figure 3-12 Removing Power Supply Vent Plate



1 Power supply slot (PS1) **2** Power supply coverplate **3** Vent plate **4** Captive screws (2)

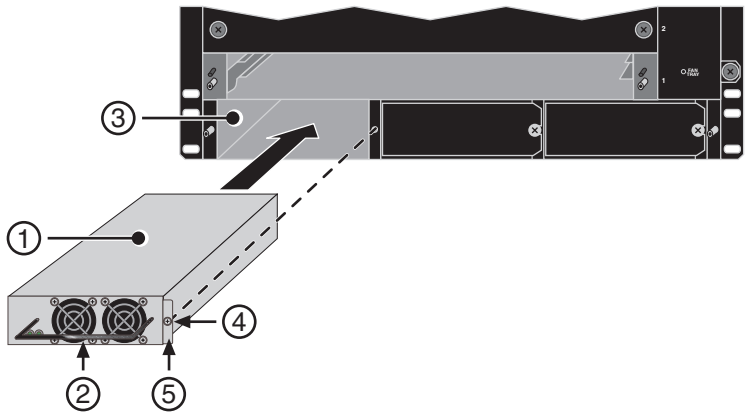
6. Locate the PS1 power supply slot, as shown in Figure 3-12.
7. Hold the power supply by placing one hand on the handle located on the front panel and using your other hand to support the power supply.
8. Position the power supply with captive screw to the right and align with the slot opening.

Caution: Forcing a misaligned power supply into place can damage the power supply or chassis backplane.

Precaución: Colocar de manera forzada una fuente de poder o no colocarla bien alineada podría dañarla y/o maltratar el panel posterior del chasis.

9. With the power supply properly inserted into the opening, carefully slide the module until it connects to the backplane, as shown in Figure 3-13. The module's handle should be nearly flush with the face of the Matrix X4-C chassis. If significant resistance is encountered before the power supply is seated, remove and reinsert it. Do not force the module into place.

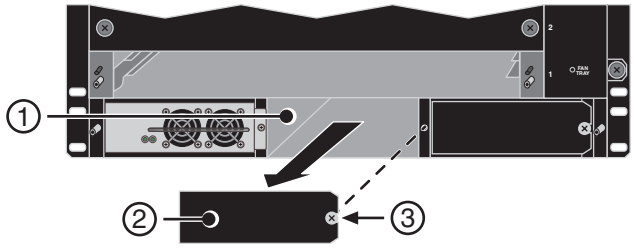
Figure 3-13 Installing Power Supply Module



1	Power supply	**3**	Power supply slot (PS1)	**5**	Power supply flange
2	Power supply handle	**4**	Captive screw		

10. Secure the power supply to the chassis by tightening the captive screw.
11. If you are installing additional power supplies, remove the coverplates from their slots by loosening their captive screws, as shown in Figure 3-14, (keep the blank plate in the event you need to remove the power supply) and repeat step 6 through step 10.

Figure 3-14 Removing Coverplate from Power Supply Slot



1	Power supply slot (PS2)	**2**	Coverplate	**3**	Captive screw

12. Replace the power supply vent plate.

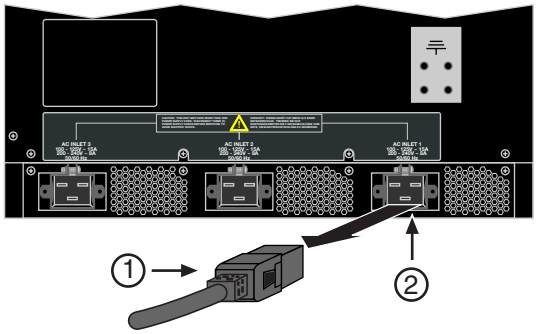
Note: Before you power up the Matrix X4-C chassis, you must complete installation of fan trays and modules.

Removing a Power Supply

To remove a power supply, proceed as follows:

1. Attach the anti-static wrist strap as described in "Attaching the Electrostatic Discharge Wrist Strap" on page 3-11 before handling the power supply module.
2. Unplug the associated power cord from the 20A/100-125 Vac (or 8A/200-240 Vac) outlet.
3. Unplug the power cord from the AC inlet (associated with the power supply you are removing) at the back of the chassis, as shown in Figure 3-15. For example, inlet *AC1* correlates with *PS1*.

Figure 3-15 Removing the AC Inlet Power Cord



1 Inlet power cord **2** AC inlet (AC1)

4. Loosen screws securing the power supply vent plate to the chassis and remove the vent plate.
5. Unscrew the captive screw to release the power supply from the chassis.
6. Remove the power supply by grasping the handle and pulling it straight out of the chassis.
7. Fasten a coverplate over the empty slot.
8. Reinstall the vent plate.

Caution: If you plan to operate the chassis with only one power supply, be sure to install the coverplate in place of the removed power supply to contain EMI radiation and ensure proper air circulation.

Precaución: Si desea trabajar sólo con una fuente de poder, no olvide colocar la tapa en el compartimiento de la fuente de poder que haya eliminado, para reducir la interferencia electromagnética y para asegurar una buena ventilación.

Installing and Removing a Fan Tray

The Matrix X4-C chassis is equipped with removable fan trays that allow for easy periodic replacement if a fan fails. To install and remove a fan tray, refer to "Installing a Fan Tray" on page 3-16 and "Removing a Fan Tray" on page 3-17.

Caution: A fan tray is hot-swappable. Do not run the chassis for an extended interval without an operating fan tray, however, because the chassis will soon overheat and be damaged.

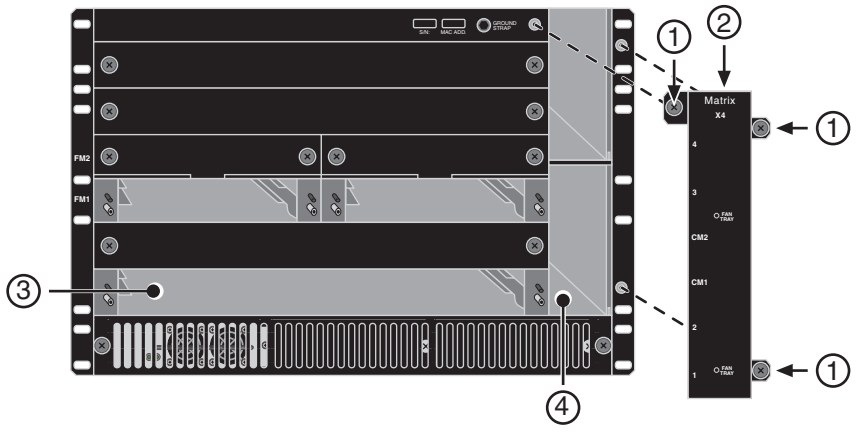
Precaución: El sistema de ventilación se puede reemplazar cuando la unidad está encendida. Sin embargo, no utilice el chasis durante largos períodos sin contar con un sistema de ventilación porque podría sobrecalentarse y dañarse.

Installing a Fan Tray

To install a fan tray, refer to the figures below as indicated in the steps below and proceed as follows:

1. Locate the ESD wrist strap shipped with the Matrix X4-C chassis. Attach the ESD wrist strap to your wrist and plug the cable from the ESD wrist strap into the ESD grounding receptacle at the bottom of the chassis as shown in Figure 3-9.
2. Unpack the fan tray by taking it from its shipping box and removing any packaging materials. (Save the shipping box and materials in the event the unit must be reshipped.)
3. Remove the fan tray from its protective plastic bag.
4. Examine the fan tray carefully, checking for damage. If any damage is noted, do not install it. Contact Enterasys Networks for instructions.
5. Unfasten three screws on the fan tray bezel, as shown in Figure 3-16. (If a cable management assembly is installed, refer to "Installing the Cable Management Assembly" on page 3-35.) Pull the bezel off the chassis.

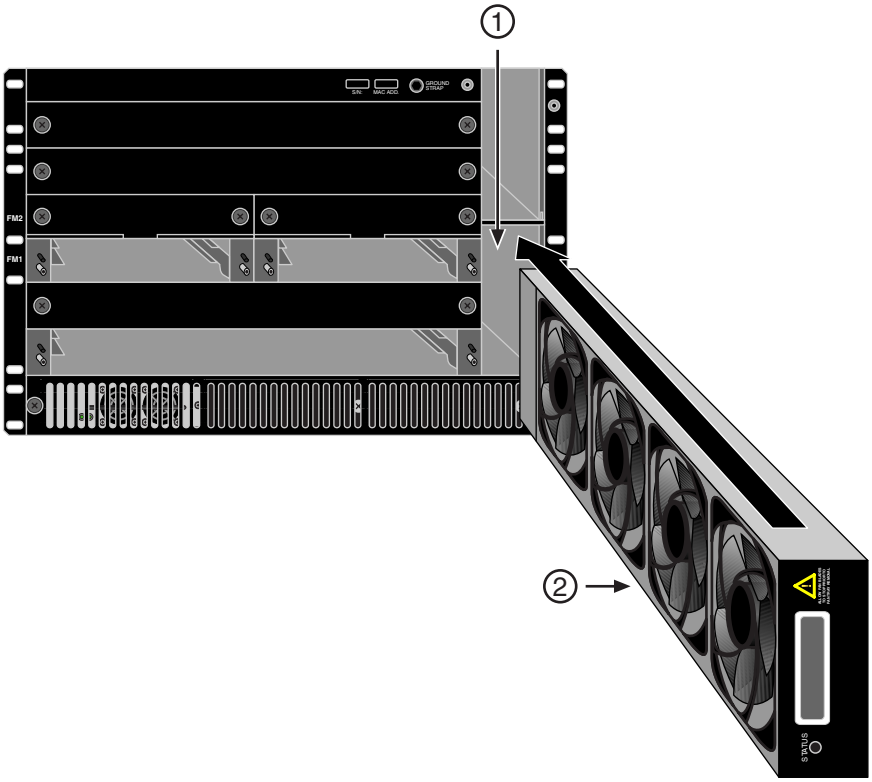
Figure 3-16 Removing Fan Tray Bezel



1 Captive screws (3) **2** Fan tray bezel **3** IOM slot 1 **4** Fan tray slot 1

6. Slowly slide the fan tray into the open slot at the side of the chassis, as shown in Figure 3-17, until it engages with the connector on the backplane.

Figure 3-17 Installing Fan Tray



1 Fan tray slot **2** Fan tray

7. Replace the fan tray bezel by lifting it into place and re-attaching the three captive screws.

Removing a Fan Tray

To remove a fan tray, proceed as follows:

Warning: Allow fan blades to stop running prior to fan tray removal.

Advertencia: Espere a que los ventiladores se detengan completamente antes de remover el sistema de ventilacion del chasis.

Warnhinweis: Warten sie mit dem Ausbau der Lüfter, bis diese zum Stehen gekommen sind.

1. Locate the ESD wrist strap shipped with the Matrix X4-C chassis. Attach the ESD wrist strap to your wrist and plug the cable from the ESD wrist strap into the ESD grounding receptacle at the upper right corner of the chassis, as shown in Figure 3-9.
2. Loosen the three captive screws securing the fan tray bezel to the chassis and remove the panel.
3. Pull the fan tray from the chassis.
4. Install the new fan tray as described earlier.
5. Replace the fan tray bezel (or the optional cable management assembly, if installed; refer to "Installing the Cable Management Assembly" on page 3-35 for more information) by re-attaching the captive screws.

Installing and Removing Modules

Installing and Removing IOMs

This section describes the installation of IOMs, and Fabric and Control Modules. Although you can populate any empty slot with its appropriate module, all chassis are delivered without coverplates on the IOM, and Fabric and Control Module slots labeled as *1*. Slots accept modules that are sized appropriately for those slots only. That is, only IOMs can fit into IOM slots, Fabric Modules into FM slots, and Control Modules into CM slots.

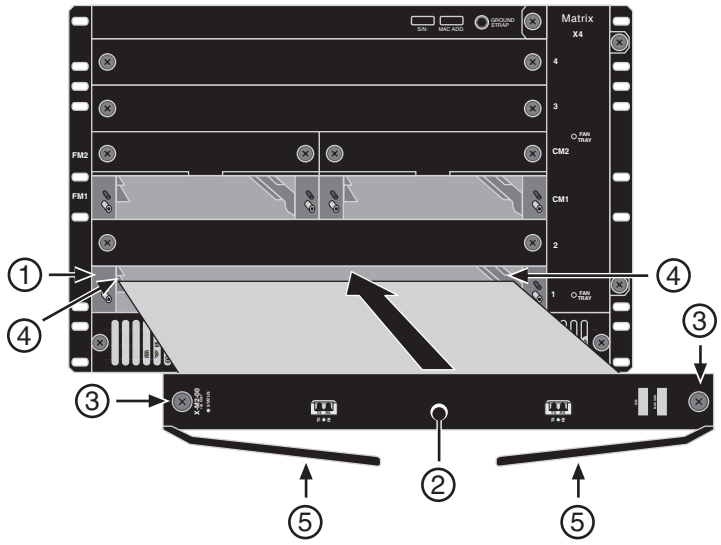
To install an IOM module, refer to the figures as indicated in the steps below and proceed as follows:

1. Locate the ESD wrist strap shipped with the Matrix X4-C chassis. Attach the ESD wrist strap to your wrist and plug the cable from the ESD wrist strap into the ESD grounding receptacle at the bottom of the chassis as shown in Figure 3-9.
2. Unpack the module by taking it from its shipping box and removing any packaging materials, and removing the module from its protective plastic bag. (Save the shipping box and materials in the event the unit must be reshipped.)
3. Examine the module carefully, checking for damage. If any damage is found, do not install it. Contact Enterasys Networks for instructions.
4. Locate Slot 1 at the bottom of the chassis and insert the IOM in the guide rail of the slot, as shown in Figure 3-18. Gently slide the module into the rack until the IOM engages the connector on the backplane, being careful that the ejector handles are in the *open* position, as shown in Figure 3-19.

Note: As you insert the IOM into the slot, be sure the ejector handles are in the open position, as shown in Figure 3-19, to avoid damaging the IOM.

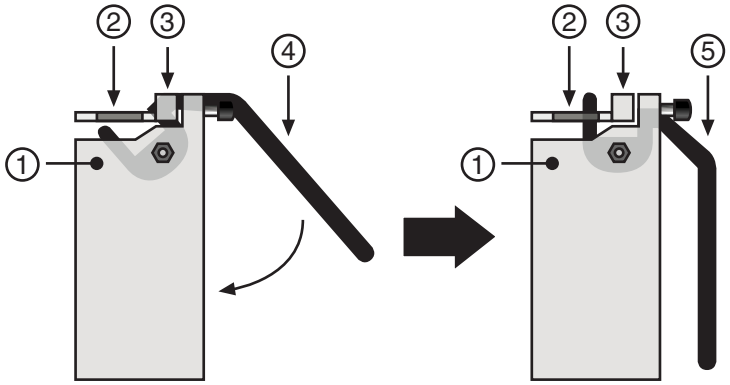
5. Push the ejector handles toward the center of the module, as shown in Figure 3-19, engaging the lip of the slot, until the module locks into place and is flush with adjoining coverplates.
6. Tighten the two captive screws.

Figure 3-18 Installing IOMs



1 IOM slot 1 **2** IOM **3** Captive screws (2) **4** IOM guide rails **5** Ejector handles

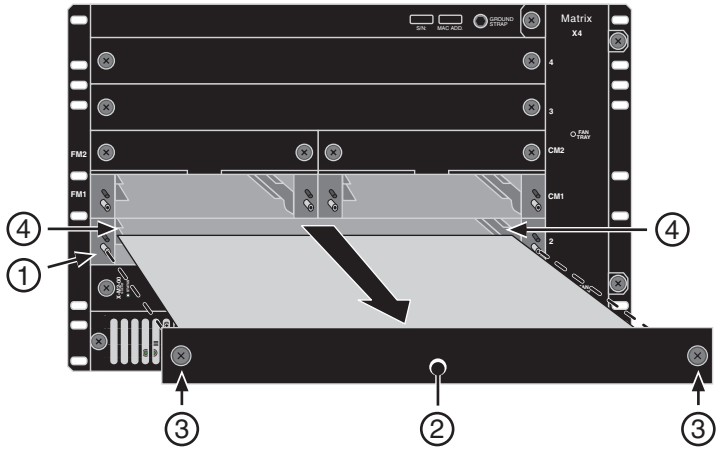
Figure 3-19 Engaging Ejector Handles



1 Module
2 Slot
3 Chassis rail
4 Ejector handle (open)
5 Ejector handle (closed)

7. To install additional modules, remove the coverplates from the slots, as shown in Figure 3-20, and repeat earlier steps. Save coverplates for optional future use.
8. After completing all module installation, be sure that you leave no slots uncovered. Failure to seal any empty slots with the provided coverplates, may hamper power cooling of the chassis and its components.
9. To remove an installed IOM, first disconnect any cabling and perform installation steps in reverse.

Figure 3-20 Removing IOM Coverplate



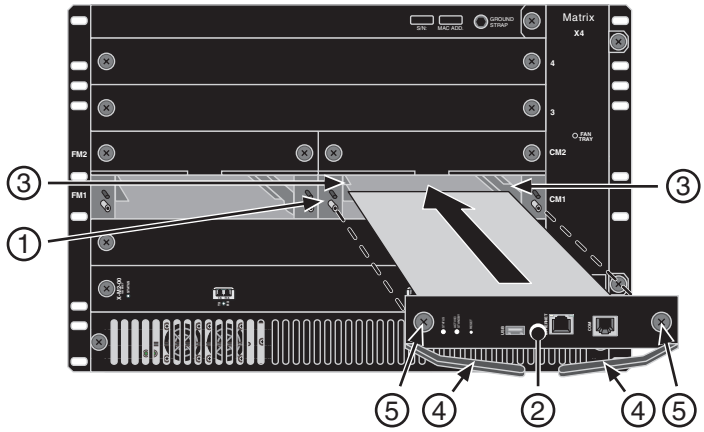
1 IOM slot 2 **2** IOM coverplate **3** Captive screws (2) **4** IOM guide rails

Installing and Removing CMs

Note: If you ordered the Memory Upgrade Kit (X-4G-MEM), install the DIMMs first. For installation instructions, refer to “Installing the Memory Upgrade Kit” on page 3-33.

1. Locate the empty CM1 slot, and position the module in the guide rail at the left of the slot, as shown in Figure 3-21. Gently insert the module until it engages with the backplane connectors. Be sure the ejector handles are open as shown in Figure 3-19.

Figure 3-21 Installing Control Module



1 Control Module slot 1
2 Control Module
3 CM guide rails
4 Ejector handles (2)
5 Captive screws (2)

2. Push the ejector handles toward the center of the module, as shown in Figure 3-19, engaging the lip of the slot, until the module locks into place and is flush with adjoining coverplates.
3. Tighten the two captive screws.
4. After completing all module installation, be sure that you leave no slots uncovered. Failure to seal any empty slots with the provided coverplates may hamper power cooling of the chassis and its components.
5. To remove an installed CM, first disconnect any cabling and perform the installation steps in reverse.

Replacing the CM Battery

If the Panasonic lithium battery on the CM is failing, the system will operate properly until a power cycle, then an error message displays (see example, below):

```
Enterasys Networks Copyright 1985-2002 Phoenix Technologies Ltd.
All Rights Reserved


* E7501 & Banias Rev #1.03 "PhoenixBIOS 2002 Q3" *
* *
*****************************************************

CPU = Mobile Genuine Intel(R) processor 1600MHz
1023M System RAM Passed
1024K Cache SRAM Passed
System BIOS shadowed
Fixed Disk 0: SAMSUNG CF/ATA
ERROR
0271: Check date and time settings
WARNING
0251: System CMOS checksum bad - Default configuration used

Press <F1> to resume, <F2> to Setup
```

Enterasys recommends that you contact Technical Support at www.enterasys.com/services/support/contact/ for service. But, if you wish to replace the battery yourself, read the following caution and refer to the instructions below.

Caution: There is an explosion risk if you replace the battery with the incorrect type. Replace with Panasonic model CR2032 only. A used battery may be safely disposed of in household waste.

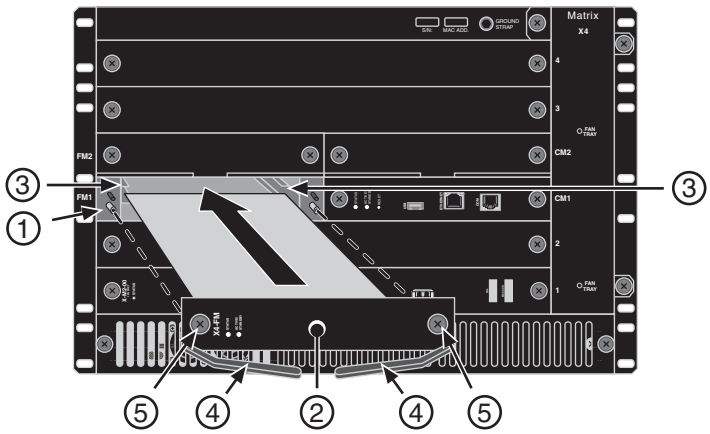
Precaución: Hay riesgo de explosion si la bateria se reemplaza con el typo incorrecto. Reemplace solo con el modelo Panasonic CR2032. Puede tirar la bateria usada en la basura.

1. Locate the ESD wrist strap shipped with the Matrix X4-C chassis. Attach the ESD wrist strap to your wrist and plug the cable from the ESD wrist strap into the ESD grounding receptacle at the upper right corner of the chassis, as shown in Figure 3-9.
2. Disconnect any cabling on the CM and remove from the chassis, placing the CM on a clean, dry surface.
3. Remove the old battery by prying it from underneath, using an upward motion on the side of the battery opposite the positive terminal leads of the connector. When the battery releases from the connector, slide it out from under the positive connector leads and remove.
4. To insert the new battery, hold and orient it in such a way that its positive terminal faces upward and its negative terminal faces downward. Find the positive and negative leads of the battery connector (the negative leads are located in the lower center of the connector and the positive leads are located on the upper connector edge).
5. Now slightly tilt the battery, positive side up, and slide this side under the positive connector leads, pushing the battery down until it snaps into place. The positive leads should be flush with the positive side of the battery and the negative leads should be under the battery and not visible.

Installing and Removing FMs

1. Locate the empty FM1 slot and position the module in the guide rail at the left of the slot, as shown in Figure 3-22. Gently insert the module until it engages with the connectors on the backplane, making sure the ejector handles are *open*, as shown in Figure 3-19.

Figure 3-22 Installing Fabric Module



1 Fabric Module slot 1
2 Fabric Module
3 FM guide rails
4 Ejector handles (2)
5 Captive screws (2)

2. Push the ejector handles toward the center of the module, as shown earlier in Figure 3-19, engaging the lip of the slot, until the module locks into place and is flush with adjoining coverplates.
3. Tighten the two captive screws.
4. After completing all module installation, be sure that you leave no slots uncovered. Failure to seal any empty slots with the provided coverplates may hamper power cooling of the chassis and its components.
5. To remove an installed CM or FM, first disconnect any cabling and perform the installation steps in reverse.

Attaching Cables, Installing Compact Flash Card and DIMM Upgrade Kit

Matrix X Router modules provide the following interfaces for cable and Flash card connections:

- IOM: XFP or SFP optical ports
- CM: Two RJ45 ports—one Ethernet for management, and one Console (COM) port for serial connections
- CM: USB port
- CM: IDE port for connection to Type I Compact Flash card

Matrix X Router IOMs support XFP (10-Gigabit Small Form-Factor Pluggable) and SFP (Small Form-Factor Pluggable) hot-swappable optical transceivers for 10- and 1-Gigabit and 10/100/1000 Ethernet connections.

Installing an XFP/SFP Module

This section describes how to install an XFP or SFP optical transceiver. For XFP/SFP specifications, refer to Appendix A, **Specifications and Regulatory Compliance**.

Caution: Carefully follow the instructions in this manual to avoid damaging the XFP/SPF and IOM module.

The XFP/SPF and IOM module are sensitive to static discharges. Use an antistatic wrist strap and observe all static precautions during this procedure. Failure to do so could result in damage to the XFP/SPF and IOM module. Always leave the XFP/SPF and IOM module in the antistatic bag or an equivalent antistatic container when not installed.

Precaución: Siga las instrucciones del manual para no dañar el XFP/SPF o la módulo IOM, puesto que son muy sensible a las descargas de electricidad estática. Utilice la pulsera antiestática y tome todas las precauciones necesarias durante este procedimiento. Si no lo hace, podría dañar el XFP/SPF y la módulo IOM. Mientras no esté instalado, mantenga el XFP/SPF y la módulo IOM en su bolsa antiestática o en cualquier otro recipiente antiestático.

Warning: Fiber-optic XFP/SFPs use Class 1 lasers. Do not use optical instruments to view the laser output. The use of optical instruments to view laser output increases eye hazard. When viewing the output optical port, power must be removed from the network adapter.

Advertencia: Los XFP/SFPs de fibra optica usan lasers de clase 1. No se debe usar instrumentos opticos para ver la potencia laser. El uso de los instrumentos opticos para ver la potencia laser incrementa el riesgo a los ojos. Cuando vean el puerto de la potencia optica, la corriente debe ser removida del adaptador de la red.

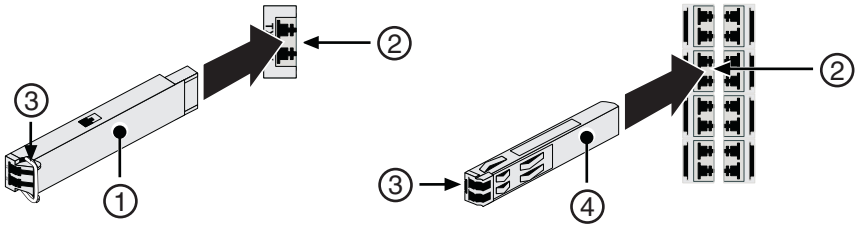
Warnhinweis: XFP/SFPs mit Fiber-Optik Technologie benutzen Laser der Klasse 1. Benutzen sie keinesfalls optische Hilfsmittel, um die Funktion des Lasers zu überprüfen. Solche Hilfsmittel erhöhen die Gefahr von Sehschäden. Wenn sie den optischen Port überprüfen möchten stellen Sie sicher, dass die Komponente von der Spannungsversorgung getrennt ist.

To install an XFP/SFP transceiver, refer to Figure 3-23 and proceed as follows:

1. Locate the ESD wrist strap shipped with the Matrix X4-C chassis. Attach the ESD wrist strap to your wrist and plug the cable from the ESD wrist strap into the ESD grounding receptacle at the bottom of the chassis as shown in Figure 3-9.
2. Remove the transceiver from its packaging.

3. Hold the transceiver so that the connector will seat properly.
4. Carefully align the transceiver with the IOM port slot, as shown in Figure 3-23.
5. Push the transceiver into the IOM port until it seats with the connector at the back of the slot.

Figure 3-23 Installing XFP/SFP Optical Transceiver



1 XFP transceiver **2** Port slot **3** Release handle **4** SFP transceiver

Removing an XFP/SFP Module

Caution: Carefully follow the instructions in this manual to avoid damaging the XFP/SPF and IOM module.

The XFP/SPF and IOM module are sensitive to static discharges. Use an antistatic wrist strap and observe all static precautions during this procedure. Failure to do so could result in damage to the XFP/SPF and IOM module. Always leave the XFP/SPF and IOM module in the antistatic bag or an equivalent antistatic container when not installed.

Precaución: Siga las instrucciones del manual para no dañar el XFP/SPF o la módulo IOM, puesto que son muy sensible a las descargas de electricidad estática. Utilice la pulsera antiestática y tome todas las precauciones necesarias durante este procedimiento. Si no lo hace, podría dañar el XFP/SPF y la módulo IOM. Mientras no esté instalado, mantenga el XFP/SPF y la módulo IOM en su bolsa antiestática o en cualquier otro recipiente antiestático.

To remove a transceiver from an IOM, refer back to Figure 3-23 and proceed as follows:

1. Attach the antistatic wrist strap before removing the XFP/SFP module.
2. Remove any network cable attached to the connector on the XFP/SFP module. To remove a connector from the transceiver interface port, grasp the handle and carefully pull the connector out of the port. It may need to be loosened by gently moving it from side to side to release the latching keys.
3. Before storing or shipping the XFP/SFP module, place it into a static-free container.

Connecting Fiber-Optic Cables

This section describes connecting 10- or 1-Gigabit Ethernet fiber-optic segments from the network or other devices to XFP or SFP port connectors (LC or MT-RJ) on Matrix X4-C IOMs.

Each fiber-optic link consists of two fiber-optic strands within the cable: Transmit (TX) and Receive (RX). The transmit strand from a module port connects to the receive port of a fiber-optic 10-/1-Gigabit Ethernet device at the other end of the segment. The receive strand of the applicable LC or MT-RJ port on the module connects to the transmit port of the fiber-optic 10-/1-Gigabit Ethernet device (shown in Figure 3-24).

The procedure below describes how to connect an LC or MT-RJ cable connector to an XFP or SFP port connector, respectively.

1. Remove the protective covers (not shown) from the LC or MT-RJ fiber-optic port on the transceiver and from the connectors on each end of the cable.

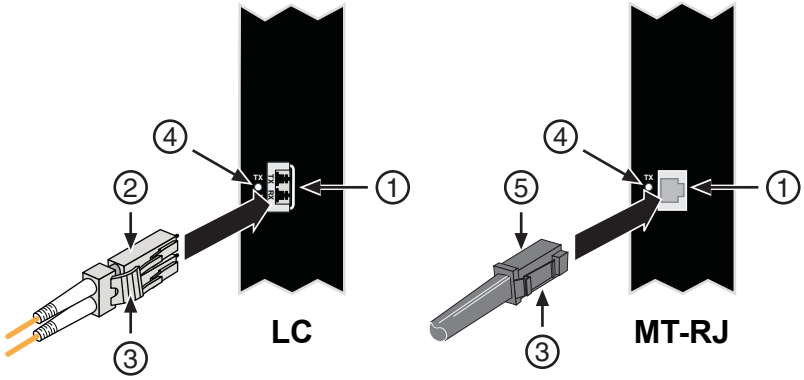
Note: Leave the protective covers in place when the connectors are not in use to prevent contamination.

Caution: Do not touch the ends of the fiber-optic strands, and do not let the ends contact dust, dirt, or other contaminants. Contamination of cable ends causes problems in data transmissions. If the ends of the fiber-optic strands become contaminated, use a canned duster to blow the surfaces clean. A cleaning swab saturated with optical-grade isopropyl alcohol may also be used to clean the ends.

Precaución: No toque los extremos de los cables de fibra óptica y evite su contacto con el polvo, la suciedad o con cualquier otro contaminante. Si los extremos de los cables se ensucian, es posible que la transmisión de datos se vea afectada. Si nota que los extremos de los cables de fibra óptica se ensucian, utilice aire comprimido para limpiarlos. También puede limpiarlos con un estropajo embebido en alcohol isopropílico.

2. Insert the LC or MT-RJ cable connector into the transceiver until it clicks into place.

Figure 3-24 Attaching LC or MT-RJ Cable Connector



1 Installed XFP/SFP
2 LC cable connector
3 Release tab
4 Transmit/Receive LED (TX/RX)
5 MT-RJ cable connector

3. Plug the other end of the cable into the appropriate port on the other device. Some cables may be terminated at the other end with two separate connectors, one for each fiber-optic strand. In this case, ensure that the transmit fiber-optic strand is connected to the receive port and the receive fiber-optic strand to the transmit port.
4. To verify link exists, you must first configure the ports for switching or routing. Refer to the *Matrix X Configuration Guide* for more information.

5. After the chassis has been powered up, verify a link exists by checking that the port RX LED is on (flashing amber, blinking green, or solid green). If the RX LED is off, perform the following steps until it is on:
   a. Verify the device at the other end of the segment is on and linked to the segment.
   b. If there are separate fiber-optic connections on the other device, check the crossover of the cables. Swap cable connections if necessary.
   c. Check that the fiber-optic connection meets prescribed dB loss and cable specifications.
6. Repeat steps 1 through 3, above, until all connections have been made.
7. To remove the LC or MT-RJ cable connector, press its release tab and pull it out of the transceiver.

Connecting to the CM COM Port

This section describes how to install a UTP cable with RJ45 connectors and optional adapters to connect the CM COM port to a PC, VT series terminal, or modem to access local management. This section also details adapter pinout assignments.

The following parts may be needed, depending on the connection:

- RJ45-to-DB9 female adapter (user-supplied)
- UTP cable with RJ45 connectors (user-supplied)
- RJ45-to-DB25 female adapter (user-supplied)
- RJ45-to-DB25 male adapter (user-supplied)

Connecting the CM COM Port to an IBM PC or Compatible Device

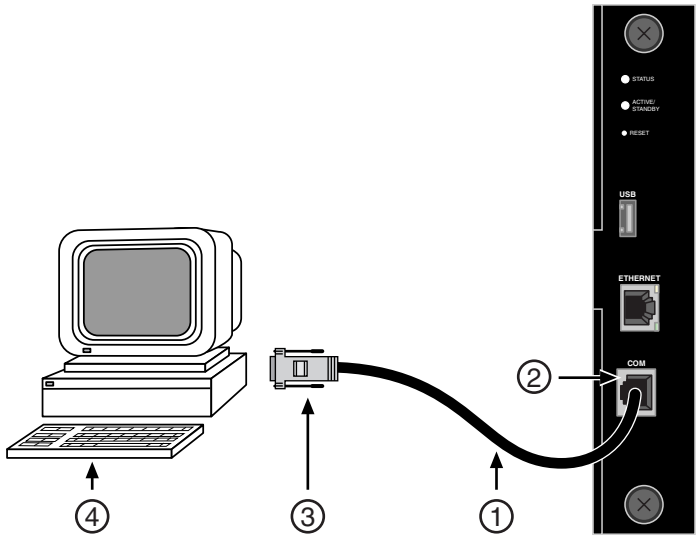
To connect an IBM PC or compatible device, running the VT terminal emulation, to the CM COM port (Figure 3-25), proceed as follows:

1. Connect the RJ45 connector at one end of the cable to the communications COM (Console) port on the CM.
2. Plug the RJ45 connector at the other end of the cable into a user-supplied RJ45-to-DB9 adapter.
3. Connect the RJ45-to-DB9 adapter to the communications port on the IBM PC.
4. Turn on the PC and configure your VT emulation package with these parameters:

Parameter	Setting
Mode	7 Bit Control
Transmit	Transmit=19,200
Bits Parity	8 Bits, No Parity
Stop Bit	1 Stop Bit

5. Connect the X4-C's power cords. Refer to "Powering Up the Matrix X4-C Chassis" on page 3-37.

Figure 3-25 Connecting an IBM PC or Compatible



1 UTP cable with RJ45 connectors
2 RJ45 COM port
3 RJ45-to-DB9 PC adapter
4 IBM PC or compatible device

Connecting the CM COM Port to a VT Series Terminal

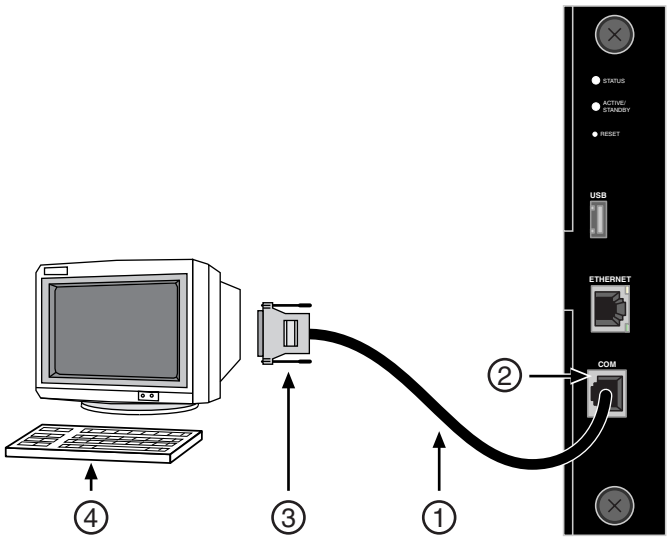
To connect a VT Series terminal to the CM COM port (Figure 3-26), use a UTP cable with RJ45 connectors and a user-supplied RJ45-to-DB25 female adapter. Proceed as follows:

1. Connect the RJ45 connector at one end of the cable to the COM port on the CM.
2. Plug the RJ45 connector at the other end of the cable into a user-supplied RJ45-to-DB25 female adapter.
3. Connect the RJ45-to-DB25 adapter to the port labeled COM on the VT terminal.
4. Turn on the terminal and access the Setup Directory. Set the following parameters:

Parameter	Setting
Mode	7 Bit Control
Transmit	Transmit=19,200
Bits Parity	8 Bits, No Parity
Stop Bit	1 Stop Bit

5. Connect the X4-C's power cords. Refer to "Powering Up the Matrix X4-C Chassis" on page 3-37.

Figure 3-26 Connecting a VT Series Terminal



1 UTP cable with RJ45 connectors
2 RJ45 COM port
3 RJ45-to-DB25 VT adapter
4 VT series terminal

Connecting the CM COM Port to a Modem

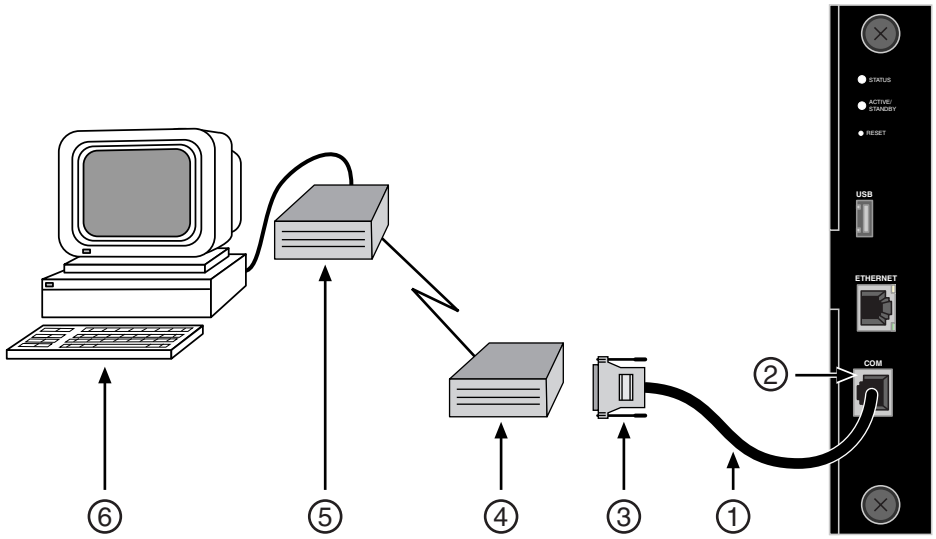
To connect a modem to the CM COM port (Figure 3-27), use a UTP cable with RJ45 connectors and a user-supplied RJ45-to-DB25 male adapter, and proceed as follows:

1. Connect the RJ45 connector at one end of the cable to the COM port of the CM.
2. Plug the RJ45 connector at the other cable end into a user-supplied, RJ45-to-DB25 modem adapter.
3. Connect the RJ45-to-DB25 adapter to the communications port on the modem.
4. Turn on the modem.
5. With a PC connected to a remote modem, you can configure the switch remotely. To do so, you must configure your PC VT emulation package with these parameters.

Parameter	Setting
Mode	7 Bit Control
Transmit	Transmit=19,200
Bits Parity	8 Bits, No Parity
Stop Bit	1 Stop Bit

6. Connect the X4-C's power cords. Refer to "Powering Up the Matrix X4-C Chassis" on page 3-37.

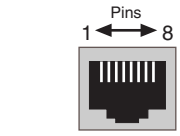
Figure 3-27 Connecting to a Modem



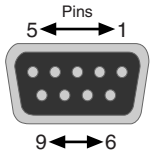
1 UTP cable with RJ45 connectors
2 RJ45 COM port
3 RJ45-to-DB25 modem adapter
4 Local modem
5 Remote modem
6 IBM PC or compatible device

Adapter Wiring and Signal Assignments

COM Port Adapter Wiring and Signal Diagram			
RJ45		**DB9**	
Pin	Conductor	Pin	Signal
1	Blue	2	Receive (RX)
4	Red	3	Transmit (TX)
5	Green	5	Ground (GRD)
2	Orange	7	Request to Send (RTS)
6	Yellow	8	Clear to Send (CTS)

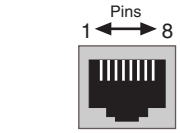


RJ45 Connector (Female)

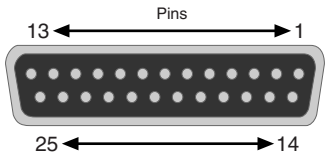


DB9 Connector (Female)

VT Series Port Adapter Wiring and Signal Diagram			
RJ45		**DB25**	
Pin	Conductor	Pin	Signal
4	Red	2	Transmit (TX)
1	Blue	3	Receive (RX)
6	Yellow	5	Clear to Send (CTS)
5	Green	7	Ground (GRD)
2	Orange	20	Data Terminal Ready

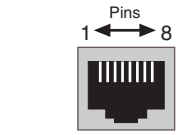


RJ45 Connector (Female)

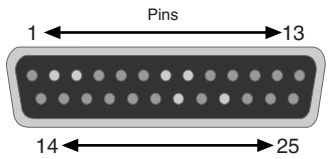


DB25 Connector (Female)

Modem Port Adapter Wiring and Signal Diagram			
RJ45		**DB25**	
Pin	Conductor	Pin	Signal
1	Blue	2	Transmit (TX)
2	Orange	8	Data Carrier Detect (DCD)
4	Red	3	Receive
5	Green	7	Ground (GRD)
6	Yellow	20	Data Terminal Ready (DTR)
8	Gray	22	Ring Indicator



RJ45 Connector (Female)

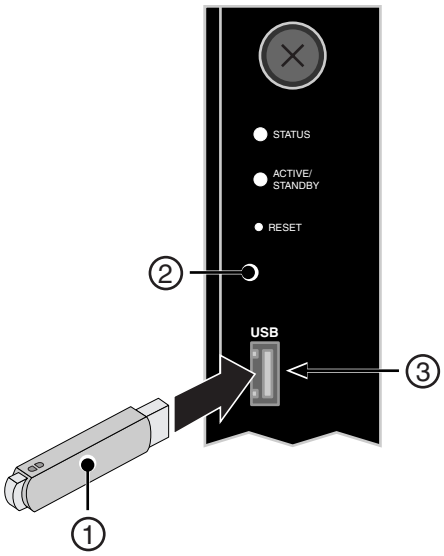


DB25 Connector (Male)

Connecting to the CM USB Port

The X4-C supports fast and easy configuration downloads using the CM USB port. Using either a USB storage device (as shown in Figure 3-28) or USB cable to a PC, you can connect to a PC and download configuration files. Simply attach the memory card or a USB cable to the port and access the CM. Refer to the *Matrix X Router Configuration Guide* for configuration details.

Figure 3-28 Attaching a USB Device to the CM

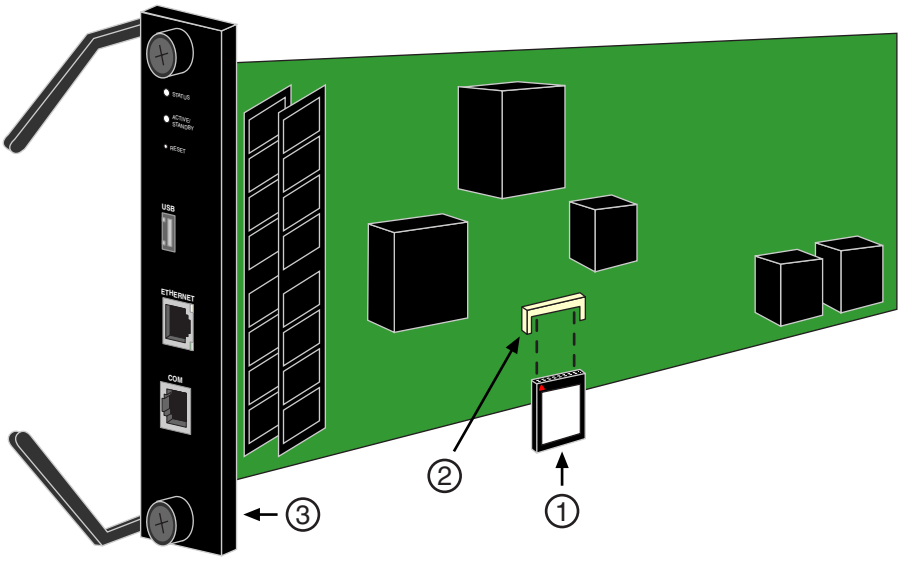


1 USB device **2** Control Module **3** USB port

Installing a Compact Flash Card

The Control Module provides an IDE port housing a 1 GB Flash memory card, as shown in Figure 3-29. If the factory-installed card fails or you want to install a new Type I Compact Flash card, simply pull the old card from its connector and insert the new card.

Figure 3-29 Installing Flash Card



1 Compact Flash card **2** Connector **3** Control Module

Installing the Memory Upgrade Kit

Caution: Only qualified personnel should perform installation procedures.

Precaución: Solamente personal calificado debe realizar procedimientos de instalacion.

The following sections describe how to upgrade the Dual In-line Memory Modules (DIMMs) on the X-CM-00 Control Module from 1 GB (two 512 MB DIMMs) to 4 GB using the two 2 GB SDRAM DIMMs included in the X-4G-MEM Memory Upgrade Kit. Both 2 GB DIMMs in the Memory Upgrade Kit must be installed at the same time.

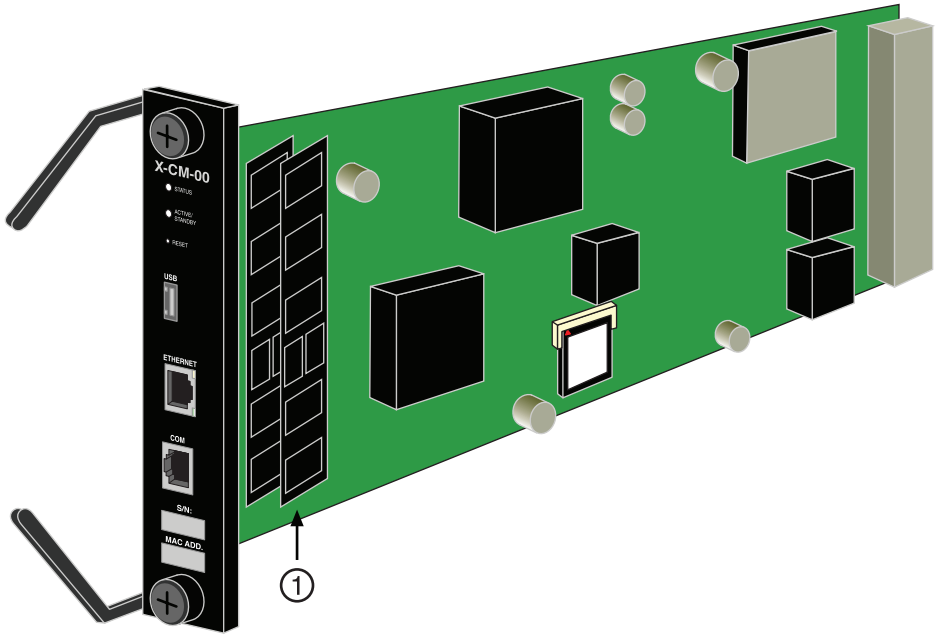
Removing the DIMMs

Caution: Observe all Electrostatic Discharge (ESD) precautions when handling sensitive electronic equipment.

Precaución: Al trabajar con equipos electrónicos sensibles, tome todas las precauciones de seguridad para evitar descargas de electricidad estática.

1. Locate the ESD wrist strap shipped with the Matrix X4-C chassis. Attach the ESD wrist strap to your wrist and plug the cable from the ESD wrist strap into the ESD grounding receptacle at the bottom of the chassis as shown in Figure 3-9.
2. Disconnect any cabling on the CM and remove the CM from the chassis, placing it on a clean, dry surface. Refer to "Installing and Removing CMs" on page 3-21.
3. Locate the DIMM connectors on the CM. Refer to Figure 3-30 for the location of the DIMM.

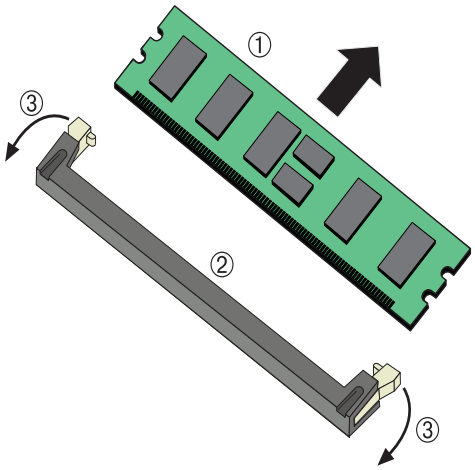
Figure 3-30 Locating the DIMMs on the CM



1 DIMMs (Dual In-line Memory Modules)

4. Push the connector arms away from the first DIMM, as shown in Figure 3-31, and remove the DIMM.

Figure 3-31 Removing the Existing DIMM



1	DIMM	**2**	Connector fingers	**3**	Connector arms

5. Repeat step 4 to remove the second DIMM.

Installing the DIMMs

Caution: Observe all Electrostatic Discharge (ESD) precautions when handling sensitive electronic equipment.

Precaución: Al trabajar con equipos electrónicos sensibles, tome todas las precauciones de seguridad para evitar descargas de electricidad estática.

To install the DIMMs and proceed as follows:

1. Make sure connector arms are pushed out.
2. Insert the first DIMM down between the connector fingers.
3. Push down on the DIMM and push in on the connector arms until the arms lock into the top notch.
4. Repeat steps 1 through 3 to install the second DIMM.

Optional Cable Management Kit

Cables can be kept neat and secure using the optional Cable Management Kit (X4-CBLMG-KIT). Using the Cable Management Kit ensures that cables are bundled close to the chassis and that cabling is not accidentally loosened or disconnected from the chassis during operation.

The Cable Management Kit (X4-CBLMG-KIT) can be ordered separately and includes the following:

- 1 cable management base panel (with 3 captive screws)
- 1 bar (with 2 captive screws)
- 4, 9-in (22.86 cm) velcro cable straps attached to the base panel

Note: The components listed above, when assembled, are referred to here as the *cable management assembly*, or simply *assembly*.

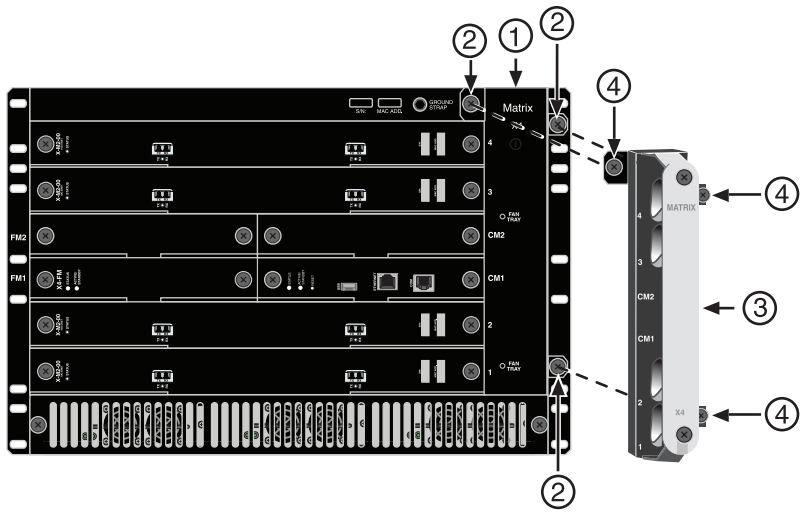
The cable management assembly replaces the existing fan tray bezel. See "Installing the Cable Management Assembly" on page 3-35. Velcro cable straps are secured to the assembly to ensure that cabling is segregated per module, thus making module removal easier (see "Securing Cables Using the Velcro Cable Straps" on page 3-36).

Installing the Cable Management Assembly

To install the cable management assembly, proceed as follows:

1. Unpack the cable management assembly from the shipping box. Examine for any damage. If the assembly is damaged, contact Enterasys Networks for instructions.
2. Remove the fan tray bezel by loosening the three (3) captive screws attaching the fan tray bezel to the chassis. See Figure 3-32.
3. Replace the removed fan tray bezel with the cable management assembly. Attach the assembly to the chassis by tightening the three (3) captive screws on the base panel of the assembly.

Figure 3-32 Installing the Cable Management Assembly

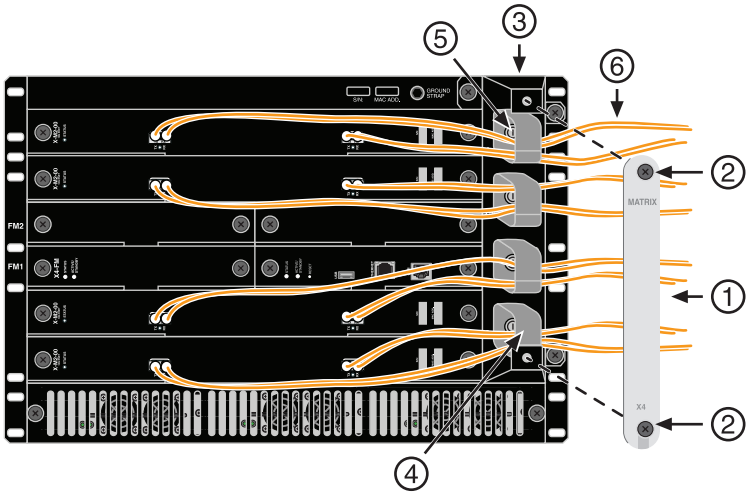


1	Fan tray bezel	**3**	Cable management assembly
2	Captive screws (3) on fan tray bezel	**4**	Captive screws (3) on cable management assembly

4. Remove the bar from the cable management assembly by loosening the two (2) captive screws on the bar. See Figure 3-33, below.
5. Gather the IOM cables you wish to bundle and wrap them in the velcro cable straps. Control Module cables may also be secured in this manner. See Figure 3-33, below.

Note: When using the velcro cable straps to bundle your cables, be sure to leave enough slack in the cables to allow you to remove the cable management assembly to install or remove a fan tray.

Figure 3-33 Securing Cables Using the Velcro Cable Straps



1	Cable management bar	**3**	Cable management assembly installed	**5**	Velcro-secured cable
2	Captive screws (2)	**4**	Velcro cable straps (4)	**6**	Cables

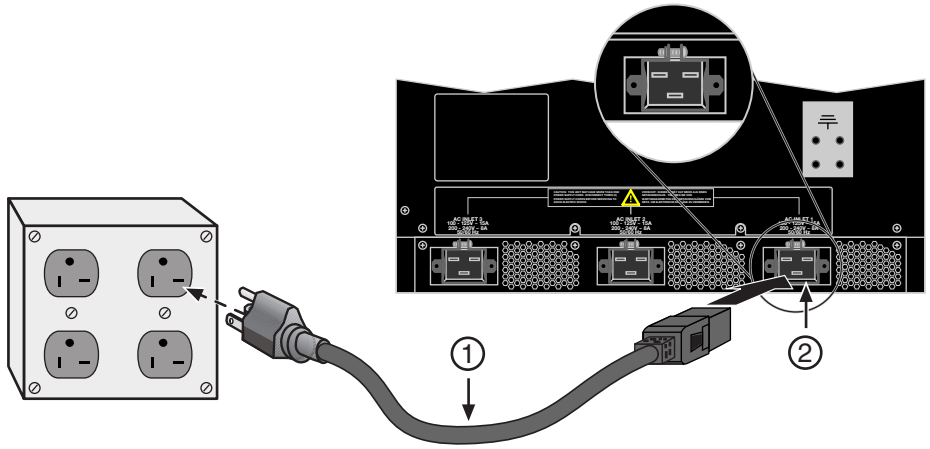
6. Reattach the bar to the cable management assembly by tightening the two (2) captive screws on the bar.
7. If you wish to remove a cable strap, simply unscrew it from the cable management base panel.

Powering Up the Matrix X4-C Chassis

To power up the Matrix X4-C chassis, proceed as follows:

1. Plug one end of each power cord (included with the power supply) into the AC power inlet on the chassis back panel and tighten the cord lock bracket screw, as shown in Figure 3-34.

Figure 3-34 Connecting 20 Amp AC Power Cord to the Power Supply



1 Power cord
2 AC inlet (AC1) with power cord bracket

NOTE: Power cords shown are for North America. Each power unit requires a 20 Amp circuit.

2. Plug the other end of each power cord into a dedicated 20 A/110 Vac or 10 A/220 Vac receptacle. If you are using the optional twist lock power cord, plug it in and turn until it locks securely. Refer to Table A-6 on page A-3 for more information.
3. Repeat steps 1 and 2 for all power cords.
4. Ensure that the Power LEDs on each power supply are green.
5. Ensure that all fans in the fan tray unit are operating properly when power is received from the power supply modules (fan tray LED will be green). For more information on the power supply LEDs, refer to "Power Supply LEDs" on page 3-38.

If you experience any problems with this installation, contact Enterasys Networks for assistance. The Matrix X4-C is now ready to be configured.

LEDs and Reset Button

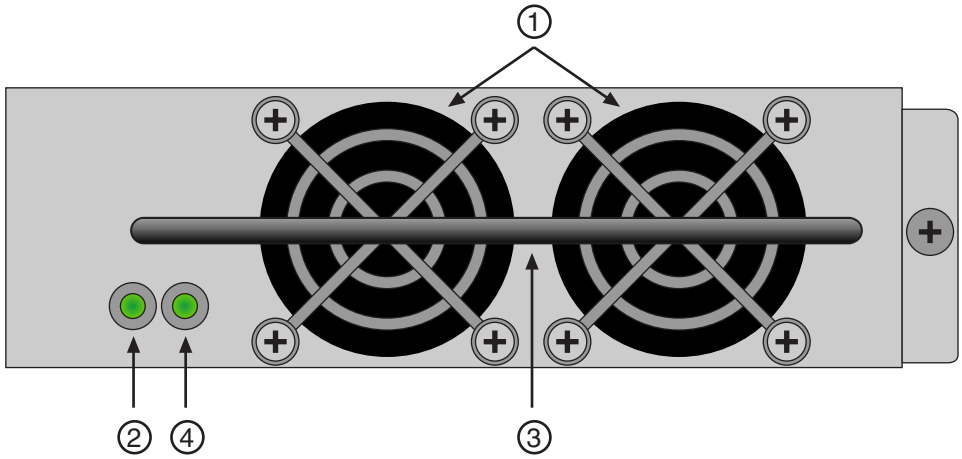
The following sections describe LED indications for the following:

- Power supplies
- Fan Trays
- IOM, CM, and FMs (with CM Reset button)

Power Supply LEDs

Two LEDs are provided on the power supply module: a DC LED indicating the operational status of outgoing power and an AC LED indicating incoming AC line voltage is sufficient or has fallen below operational limits. Refer to Figure 3-35 for their location and Table 3-1 for a description of LED function. Power supplies are installed in chassis slots PS1 through PS3 at the base of the chassis.

Figure 3-35 Power Supply LEDs



1 Intake cooling fans **2** DC Power LED **3** Handle **4** AC Power LED

Table 3-1 DC/AC Power Supply (PS1-PS3) LED Definitions

Function	LED Activity
DC Power LED	
Power supply successfully providing 48VDC to the system	Green
Power supply malfunctioning	Off
AC Power LED	
Sufficient AC power supply (influx)	Green
No AC power into the module	Off

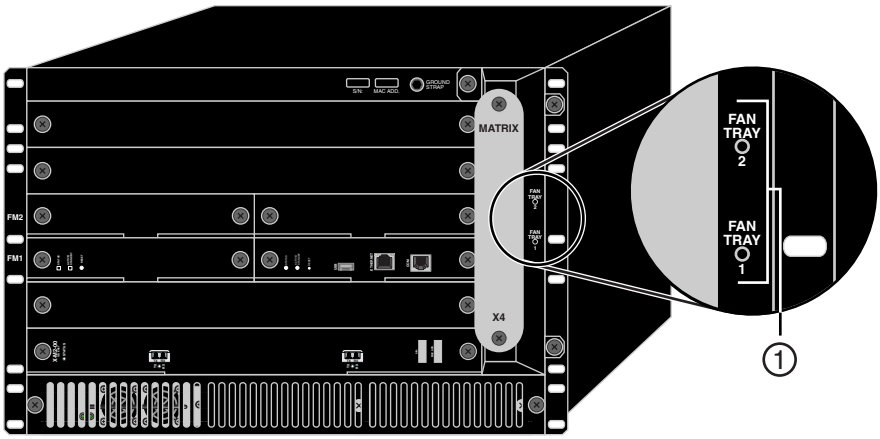
Fan Tray LED

Each fan tray provides a status LED on its front panel. Fan tray LEDs are also included on the cable management base panel. Refer to Figure 3-36 and Figure 3-37 for LED locations and Table 3-2 for their description.

Figure 3-36 Fan Tray LED

1 Fan tray Status LED

Figure 3-37 Cable Management Base Panel LEDs



1 Fan tray LEDs on the cable management base panel

Table 3-2 Fan Tray LED Definitions

Function	LED Activity
Fan tray functioning correctly	Green
Fan tray not powered	Off
Fan tray status during initialization and diagnostics	Blinking green
Unit's fan failed or module overheated but still provides enough cooling	Amber
Unsupported configuration has been set from the CM	Blinking amber
Fan tray failed and requires attention	Red

The following additional conditions apply:

- After power up, the fan tray LED remains red until diagnostics begin, then will blink green. When blinking amber, the fan controller will run a default configuration.
- An overheating warning indicates fans are running at high speed. Fans operate at normal speed if no warning is received.

Caution: If the LED remains red, replace the fan tray immediately. Otherwise, the system may overheat and damage chassis components.

Precaución: Si observa que la lucecita roja no se apaga, cambie inmediatamente el sistema de ventilación. Si no lo hace, el sistema se sobrecalentará y los componentes del chasis se dañarán.

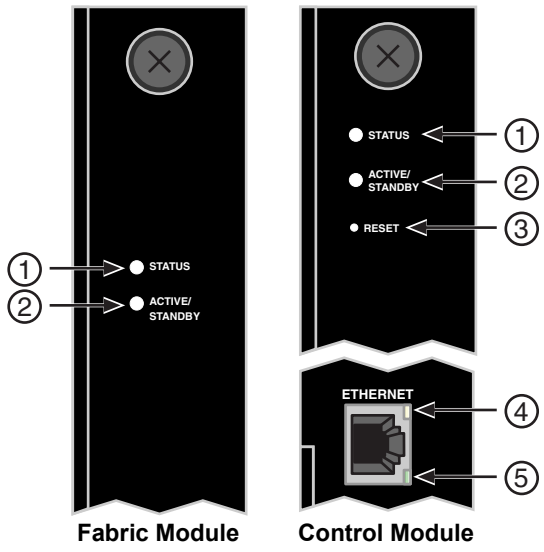
Module LEDs and Reset Button

Control and Fabric Module LEDs

Two LEDs are provided for CMs and FMs, STATUS and ACTIVE/STANDBY, as shown in Figure 3-38. Additionally, Speed (10/100/1000 Mbps) and Status LEDs on the CM Ethernet RJ45 port indicate a 10, 100, or 1000 Mbps link. LED definitions are provided in Table 3-3.

The CM also provides a Reset button which warm-reboots the module, suspending service for the duration of the reboot. If two CMs are installed however, service is not interrupted.

Figure 3-38 Fabric and Control Module LEDs and Reset Button



1 STATUS LEDs
2 ACTIVE/STANDBY LEDs
3 RESET button
4 10/100/1000 LED
5 Link LED

Table 3-3 Control and Fabric Module LED Definitions

CM & FM LEDs	State	LED Activity
Status	Not powered	Off
	Diagnostics failed, module requires attention, or state before initialization is complete	Red
	LED blinks during initialization and diagnostics	Blinking green
	Diagnostics passed and software operational	Green
	Both chassis PROMs failed	Amber
Active/Standby	Not powered	Off
	Power on but not configured, hardware not initialized	Red
	Module is Active	Green
	Module is on Standby	Amber
CM LEDs Only	**State**	**LED Activity**
Ethernet Status (Link)	Link established	Green
	Link established and traffic flowing	Blinking green
	Unpowered, link or system failure, or administratively disabled	Off
Ethernet Speed (10/100/1000)	1000 Mbps	Off
	100 Mbps	Green
	10 Mbps	Yellow

The following additional conditions apply:

- After module power up, the CM/FM STATUS LED will remain red until diagnostics begin then will blink green.
- After module power up, the ACTIVE/STANDBY LED will initially indicate Standby state until it registers either the Active or Standby state.
- When a link is not present, the Speed LED will be off.

IOM LEDs

All IOM cards include one Status LED for the card and Transmit and Receive or Link/Activity and Speed LEDs for each port. Refer to the Quick Reference card for your IOMs for more specific LED information.

LED definitions for the Status LED and the TX/RX LEDs for single-speed Ethernet ports are given in Table 3-4.

Table 3-4 IOM LED Definitions

Status LED	LED Activity
Diagnostics failed, module requires attention, or state before hardware initializes	Red
LED blinks during initialization and diagnostics	Blinking green
Diagnostics passed and software operational	Green
Not powered	Off
Ethernet Port LED (RX/TX)	**LED Activity**
Link established	Green
Activity over link	Blinking green
No power, link failure, system failure or administratively disabled	Off

The following additional conditions apply:

- After IOM power up, the STATUS LED will remain red until diagnostics begin then will blink green.

First-Time Quick Configuration

This section describes the minimal configuration required to facilitate first-time communications with the Matrix X4-C. Consider the following:

- Decide whether you will configure the Matrix X4-C for switching (bridging) or routing:
  - If routing, assign an IP address to interface eth0 for management access. Refer to "Assigning an IP Address to eth0" on page 3-43.
  - If switching, configure the Dynamic Host Configuration Protocol (DHCP) for network IP address assignment. Refer to "Configuring DHCP" on page 3-43.

Note: Be aware that a statically or DHCP-assigned IP address is accessible from within that subnet by a host directly connected to the interface (via a switch) but if you need to connect to the console from a host on a different subnet, you must configure a static route to that host. Refer to the *Matrix X Router Command Line Interface Reference Guide* for more information.

- Enable the Network Time Protocol (NTP) to configure proper chassis clocking. Refer to "Enabling NTP" on page 3-43.
- Designate a name, location, and contact for the Matrix X4-C. Refer to "Naming the Matrix X4-C" on page 3-43.

For more detailed information about configuring the Matrix X4-C, refer to the *Matrix X Router Configuration Guide*, which is available online at:

http://www.enterasys.com/support/manuals

Assigning an IP Address to eth0

To assign an IP address to the Matrix X4-C's management interface (eth0), enter the following commands at the CLI prompt:

```
1. matrix-x(switch-su) router
2. matrix-x(router-exec)# configure terminal
3. matrix-x(router-config) interface eth0
4. matrix-x(router-config-if-eth0) ip address {ip_address}(ip-mask)
5. matrix-x(router-config-if-eth0) no shutdown
6. matrix-x(router-config-if-eth0) exit
```

Configuring DHCP

To set up the Matrix X4-C as a DHCP client on your network, enter the following commands at the CLI prompt.

```
1. matrix-x(switch-su) router
2. matrix-x(router-exec)# configure terminal
3. matrix-x(router-config) ip route 0.0.0.0 {ip-address}
4. matrix-x(router-config) interface {port_type.slot.port}
5. matrix-x(router-config-if-xx.x.x) ip address dhcp
6. matrix-x(router-config-if-xx.x.x) exit
```

Enabling NTP

To configure NTP for the Matrix X4-C, enter the following commands at the CLI prompt. The following commands enable the Matrix X4-C either as an NTP client or server. Specify s*et ntp client broadcast* to accept time synchronization from any NTP server and s*et ntp client unicast* to accept time from a particular server. Alternatively, configure the Matrix X4-C to accept time synchronization from a particular NTP server (the system must be in unicast mode). You can define up to 10 NTP servers. Optionally, if using multiple NTP servers, use the keyword *prefer* to specify which NTP server is the preferred server.

```
1. matrix-x(switch-su) set ntp client {broadcast | unicast}
2. matrix-x(switch-su) set ntp server {ip-address [prefer]}
```

Set the round-trip broadcast delay for NTP broadcast frames, ranging from *1* to *999999* microseconds. This delay is meant for NTP running on high-speed LANs with many hosts and where the greatest accuracy is not required.

```
3. matrix-x(switch-su) set ntp broadcastdelay [1-999999]
```

Naming the Matrix X4-C

To specify a name, location and system contact for your Matrix X4-C, enter the following commands at the CLI prompt:

```
1. matrix-x(switch-su) set system name [string]
2. matrix-x(switch-su) set system location [string]
3. matrix-x(switch-su) set system contact [string]
```

A

Specifications and Regulatory Compliance

This appendix provides information about the following:

For information about:	Refer to page ...
Chassis, Power Supply, and Fan Tray Specifications	A-1
Power Supply Requirements, Specifications, and Twist Lock Options	A-2
10-Gigabit Ethernet Transceiver Specifications (XFP)	A-3
1-Gigabit Ethernet Transceiver Specifications (SFP)	A-4
SFP Input/Output Specifications	A-5
COM Port Pinout Assignments	A-8
Regulatory Compliance	A-8

Enterasys Networks reserves the right to change the specifications at any time without notice.

Chassis, Power Supply, and Fan Tray Specifications

Matrix X-Series chassis, power supply, and fan tray module physical specifications are detailed in Table A-1.

Table A-1 Matrix X4-C Specifications

Item	Specification
Matrix X4-C Chassis	
Dimensions	30.96 H x 44.78 W x 59.69 D (cm) 12.19 H x 17.63 W x 23.50 D (in.)
Weight	22.68 kg (50 lb)
MTBF (Predicted)	200,000 hours
AC Power Supply Module	
Dimensions	4.45 H x 12.7 W x 29.85 D (cm) 1.75 H x 5.0 W x 11.75 D (in.)
Weight	2.18 kg (4.8 lb)
MTBF (Predicted)	247,000 hours

Table A-1 Matrix X4-C Specifications (continued)

Item	Specification
Fan Tray	
Dimensions	4.13 cm H x 12.7 cm W x 56.52 cm D 1.625 in. H x 5.0 in. W x 22.25 in. D
Weight	3.31 kg (7.3 lb)
MTBF (Predicted)	381,219 hours
Environmental	
Operating Temperature	5°C to 40°C (41°F to 104 °F)
Storage Temperature	-30°C to 73°C (-22°F to 164°F)
Operating Relative Humidity	5% to 95% (non-condensing)

Power Supply Requirements, Specifications, and Twist Lock Options

The requirements for Matrix X Router AC power supply modules are as follows:

Table A-2 AC Power Supply Requirements

Item	Specification
Input Frequency	50 to 60 Hz
Input (Voltage/Current)	100 to 125 Vac: 16 A 200 to 240 Vac: 8 A
Output Power	1160/1500 Watts

The power specifications for Matrix X Router modules, shown in Table A-3, and redundancy configuration tables, shown in Table A-4 and Table A-5, are useful guides for power budget planning. To estimate a power budget, simply total the wattage of each installed module, making sure the combined wattage consumed is *no greater than 100%* of the output of the power supply(ies).

Table A-3 Module Power Specifications

	@ 110 Vac / 220 Vac	
Module	**Power (Watts)**	**Thermal Output (BTU/HR)**
CM	97 Watts	331.1 BTU/HR
Fan tray	85 Watts	290.1 BTU/HR
X4-FM	30 Watts	102.4 BTU/HR
X8-FM	62 Watts	211.6 BTU/HR
X16-FM	98 Watts	334.5 BTU/HR
X-G32-00	155 Watts	520.0 BTU/HR
X-GT16-00	105 Watts	358.3 BTU/HR

Table A-3 Module Power Specifications (continued)

X-M2-00	155 Watts	520.0 BTU/HR
X-T32-00	155 Watts	520.0 BTU/HR

Table A-4 Redundancy Configurations for AC Line 100—240 Vac

No. of Power Supplies	Maximum Redundant System Load[1]	Redundancy Configuration
2	1160 Watts	1 + 1
3	2320 Watts	N + 1

1. The sum of individual power draws for all installed fan trays, control and fabric modules, and IOMs.

Table A-5 Redundancy Configurations for AC Line 200—240 Vac

No. of Power Supplies	Maximum Redundant System Load[1]	Redundancy Configuration
2	1500 Watts	1 + 1
3	3000 Watts	N + 1

1. The sum of individual power draws for all installed fan trays, control and fabric modules, and IOMs.

Matrix X4-C twist lock power cord options are as follows:

Table A-6 Twist Lock Power Cord Options

Enterasys Part Number	Twist Lock Plug Type	Power Requirement	Receptacle Type
TL-20A-CORD	NEMA L5-20P	110V 20A	NEMA L5-20R
TL-L615P-USCORD	NEMA L6-15P	220V 15A	NEMA L6-15R

10-Gigabit Ethernet Transceiver Specifications (XFP)

The 10-Gigabit XFP (10-Gigabit Small Form Factor Pluggable) interface port slots on Matrix X Router IOMs can support various optional 10-Gigabit Ethernet (10 GbE) standard type fiber-optic modules. As of the printing of this guide, 10GBASE-LR, -ER, -ZR, and -SR types are available. Table A-7 through Table A-9 provide specifications for each module.

Table A-7 XFP Port, Physical, and Environmental Specifications

Item	Specification
2-port 10 GigaBASE	Two slots support a full 10 Gbps using LR, ER, ZR, and SR compliant XFPs.
Physical Dimensions	8.5 H x 18.35 W x 78.0 L (mm) 0.34 H x 0.72 W x 3.07 L (in.)
Approximate Weight	Net: 0.34 gm (1.2 oz)
Operating Temperature	5° to 40° C (41° to 104° F)
Storage Temperature	-30° to 73° C (-22° to 164° F)
Operating Relative Humidity	5% to 90% (non-condensing)

Table A-8 provides the input/output specifications for each XFP version as specified in the IEEE 802.3ae-2002 standard.

Table A-8 XFP Fiber-Optic Specifications

Module	Wavelength	Tx Power Min/Max (avg.)	Rx Sensitivity Min/Max (avg.)	Link Power Budget	MTBF (hours)
10GBASE-LR-XFP	1310 nm DFB	-8.2 / 0.5 dBm	-14.4 / 0.5 dBm	9.4 dB	2,631,579
10GBASE-ER-XFP	1550 nm EML	-4.7 / 4.0 dBm	-15.8 / -1.0 dBm	15 dB	2,000,000
10GBASE-ZR-XFP	1550 nm EML	0 / 4.0 dBm	-25 / -7.0 dBm	18 dB	1,164,047
10GBASE-SR-XFP	850 nm VCSEL	-7.3 / -1.0 dBm	-9.9 / -1.0 dBm	7.3 dB	4,081,633

The following XFP specifications in Table A-9 meet or exceed the IEEE 802.3ae-2002 standard.

Table A-9 Recommended Cable Types and Specifications

Item	Type	Max. Reach	Min. Reach[1]	Connector
10GBASE-LR-XFP	SMF (Single Mode Fiber)	10 km (6.21 mi)	2 m (6.6 ft)	LC
10GBASE-ER-XFP	SMF (Single Mode Fiber)	40 km (24.85 mi)[2]	2 m (6.6 ft) with minimum of 5 dB attenuation	LC
10GBASE-ZR-XFP	SMF (Single Mode Fiber)	80 km (49.7 mi)	2 m (6.6 ft) with minimum of 11 dB attenuation	LC
10GBASE-SR-XFP	MMF (Multimode Fiber)	300 m (984 ft)	2 m (6.6 ft)	LC

1. The limiting factor is saturation of the receiver by the transmitter. When presented with a signal at a strength above the saturation point, the receiver cannot distinguish between pulses, though no hardware damage occurs.
2. Links longer than 30 km for the same link power budget are considered engineered links. Attenuation for such links needs to be less than the minimum

1-Gigabit Ethernet Transceiver Specifications (SFP)

The following Small Form Factor Pluggable (SFP) optical transceivers are supported on the Matrix X4-C. Specifications for the following modules are described below.

- MGBIC-LC01
- MGBIC-LC03
- MGBIC-LC09
- MGBIC-MT01
- MGBIC-08
- MGBIC-02

SFP Input/Output Specifications

Matrix X Router Ethernet port interfaces accept 1000BASE-SX short wavelength or 1000BASE-LX long wavelength fiber SFPs (see Table A-10) and are hot swappable.

Table A-10 Mini-GBIC Input/Output Port Specifications

Item	Specification
MGBIC-LC01	1 LC fiber-optic multimode port compliant with 1000BASE-SX LC connector
MGBIC-LC03	1 LC fiber-optic multimode port compliant with 1000BASE-SX LC duplex style connector
MGBIC-LC09	1 LC fiber-optic single-mode port compliant with 1000BASE-LX LC connector
MGBIC-MT01	1 MT-RJ fiber-optic multimode port compliant with 1000BASE-SX MT-RJ connector
MGBIC-08	1 LC fiber-optic single-mode port compliant with 1000BASE-ELX LC connector
MGBIC-02	1 RJ45 copper connection compliant with 1000BASE-T RJ45 connector

MGBIC-LC01/MGBIC-MT01 Specifications (1000BASE-SX)

Table A-11 MGBIC-LC01 / MGBIC-MT01 Optical Specifications

Item	62.5 µm MMF	50 µm MMF
Transmit Power (minimum)	-9.5 dBm	-9.5 dBm
Receive Sensitivity	-17 dBm	-17 dBm
Link Power Budget	7.5 dBm	7.5 dBm

Table A-12 MGBIC-LC01 / MGBIC-MT01 Operating Range

Item	Modal Bandwidth @ 850 nm	Range
62.5 µm MMF	160 MHz/km	2-220 Meters
62.5 µm MMF	200 MHz/km	2-275 Meters
50 µm MMF	400 MHz/km	2-500 Meters
50 µm MMF	500 MHz/km	2-550 Meters

MGBIC-LC03 Specifications (1000BASE-SX)

Table A-13 MGBIC-LC03 Optical Specifications

Item	62.5/125 µm MMF	50/125 µm MMF
Transmit Power (minimum)	-9.5 dBm	-9.5 dBm
Transmit Power (maximum)	-3 dBm	-3 dBm
Receive Sensitivity	-20 dBm	-20 dBm
Link Power Budget[1] (Multimode Only)	10.5 dBm	10.5 dBm

1. The maximum drive distance (up to 2 km) depends on the quality of the installed multimode fiber-optic cable segment. Use the Link Power Budget to calculate the maximum cable length of the attached segment. The Link Power Budget must not exceed those specified in this table. The MGBIC-LC03 input power must not exceed -3 dBm. Otherwise, saturation could occur.

Table A-14 MGBIC-LC03 Operating Range

Item	Modal Bandwidth @ 1310 nm	Range
62.5 µm MMF	160 MHz/km	2,000 Meters
50 µm MMF	400 MHz/km	2,000 Meters

MGBIC-LC09 Specifications (1000BASE-LX)

Table A-15 MGBIC-LC09 Optical Specifications

Item	62.5 µm MMF	50 µm MMF	10 µm SMF
Transmit Power (minimum)	-11.5 dBm	-11.5 dBm	-9.5 dBm
Receive Sensitivity	-20 dBm	-20 dBm	-20 dBm
Link Power Budget	8.5 dBm	8.5 dBm	10.5 dBm

Table A-16 MGBIC-LC09 Operating Range

Item	Modal Bandwidth @ 1300 nm	Range
62.5 µm MMF	500 MHz/km	2-550 Meters
50 µm MMF	400 MHz/km	2-550 Meters
50 µm MMF	500 MHz/km	2-550 Meters
10 µm SMF	N/A	2-10,000 Meters

MGBIC-08 Specifications (1000BASE-ELX)

Table A-17 MGBIC-08 Optical Specifications

Item	10 µm SMF		
Transmit Power (minimum)	-0 dBm, min.	+2 dBm, typical	+5 dBm, max.
Receive Sensitivity	-24 dBm, min.	-26 dBm, typical	
Maximum Input Power	-3 dBm		
Link Power Budget[1] (Full Duplex Only)	23 dB	28 dB, typical	

1. The maximum drive distance (up to 70 km) depends on the quality of the installed single-mode fiber-optic cable segment. Use the Link Power Budget to calculate the maximum cable length of the attached segment. The Link Power Budget must not exceed those specified in this table. The MGBIC-08 input power must not exceed -3 dBm. Otherwise, saturation could occur.

Table A-18 MGBIC-08 Operating Range

Item	1550 nm	Range
9 or 10 µm SMF	N/A	70,000 Meters

MGBIC-02 Specifications (1000BASE-T)

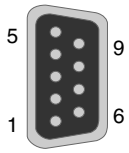
Table A-19 MGBIC-02 Specifications

Item	Specification
Supported Cable Type	Copper, Category 5 UTP
Maximum Length	Up to 100 meters
Connector	RJ45
Data Rate	1 Gbps, IEEE 802.3:2000 compatible 1000BASE-T operation only Automatic crossover detection
TX Output impedance	100 ohms, typical at all frequencies between 1 MHz and 125 MHz
RX Input impedance	100 ohms, typical at all frequencies between 1 MHz and 125 MHz

COM Port Pinout Assignments

The COM port is a serial communications port for local access to local management, as shown in Figure A-1. Refer to Table A-20 for the COM port pin assignments.

Figure A-1 COM Port Pin Assignments



Pins 1 through 9 are numbered vertically from bottom to top, left to right.

Table A-20 COM Port Pin Assignments

Pin	Signal Name	Input/Output
1	Transmit Data (XMT)	Output
2	Clear to Send (CTS)	Input
3	Data Set Ready (DSR)	Input
4	Receive Data (RCV)	Input
5	Signal Ground (GND)	NA
6	Request to Send (RTS)	Output
7	Data Terminal Ready (DTR)	Output
8	Data Carrier Detect (DCD)	Input

Regulatory Compliance

The equipment meets the following safety and electromagnetic compatibility (EMC) requirements:

Table A-21 Regulatory Requirements

Item	Specification
Safety	UL 60950, CSA C22.2 No. 60950, EN 60950, IEC 60950. Modules which support laser connections also meet the EN 60825 and 21 CFR 1040.10 standards.
Electromagnetic Compatibility (EMC)	FCC: 47 CFR Parts 2 and 15, CSA C108.8, EN 55022, EN 61000-3-2, EN 61000-3-3, EN 55024, AS/NZS CISPR 22, VCCI V-3

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Numerics

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